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Improved Automatic Grain Dryer.

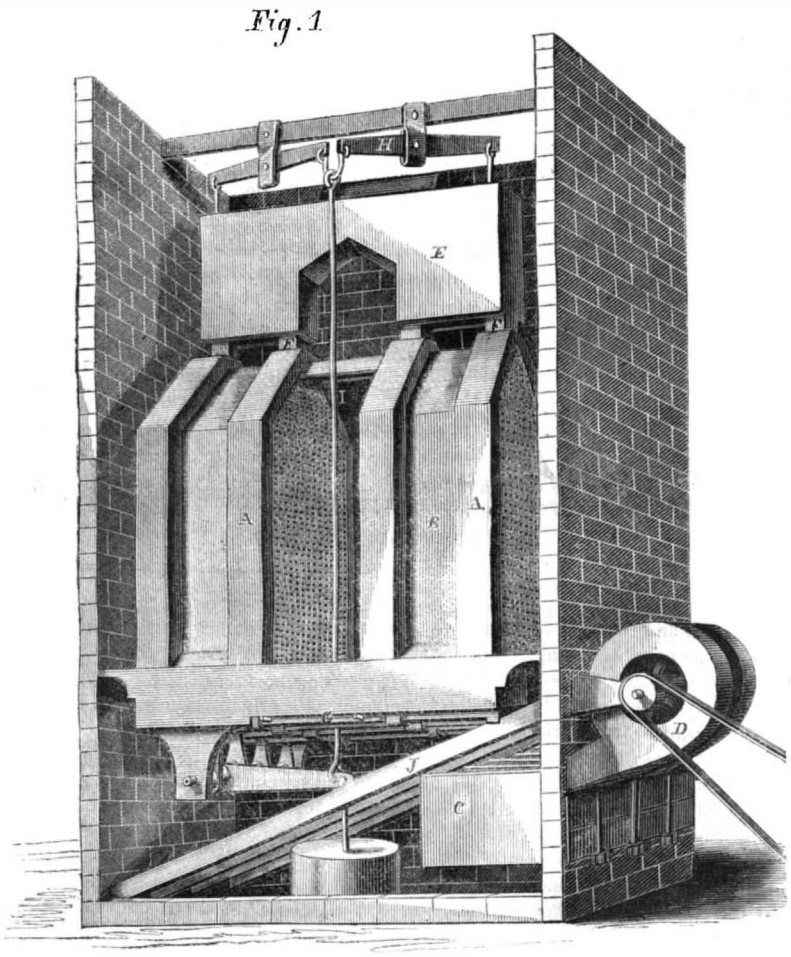
An immense business has sprung up of late years in the simple but very necessary matter of drying grain, so as to render it fit for transportation or storing. It is well known to most persons that when cereals are stored up in large quantities, the center of the mass is unventilated and rapidly deteriorates in value, until in the course of time it becomes utterly worthless. The chemical constituents of the grain change their character, undergoing fermentation and from thence molding, so that the produce is valueless. This fact is also observable in flour; when closely packed for a long time it becomes musty and sour, and barrels of a peculiar kind have been invented to guard against this evil.

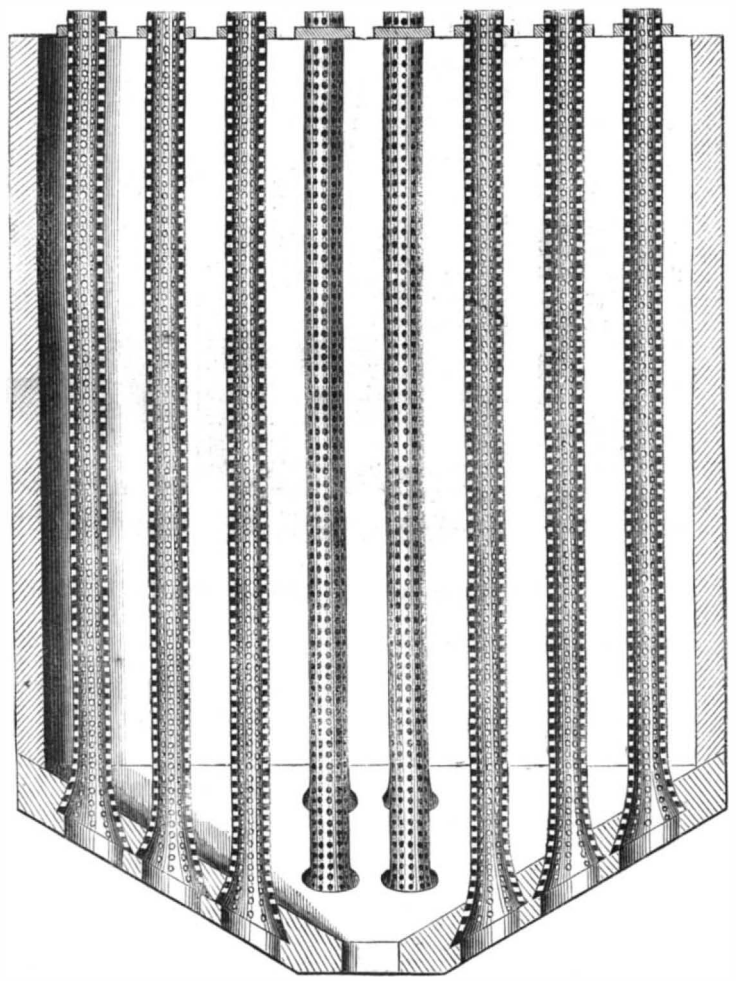
Mr. S. Marsh, the inventor of the automatic grain dryer herewith illustrated, has been experimenting for a long time on this subject, and has produced this apparatus, believing it to be based on sound principles; and his faith in its value is well sustained by the results of practice; one of these grain dryers having been in operation for a long time in Brooklyn. The principle idea of this apparatus is to expose a large superficial area of grain in thin layers between perforated metallic partitions, as at A, in Fig. 1. These partitions have a hot-air flue, B, running up through them.

It will be seen, therefore, that as the heated air from the furnace, C, is forced up the flue by the action of the fan, D, that it comes in contact with the grain and deprives it of moisture; and not only this, but as there is no other outlet the air must permeate the whole mass, thus drying every kernel as thoroughly as those on the outside, or next the metallic walls of the partition. In order that this shall be perfectly done the grain partitions are fitted with a self-acting hopper, E, which works in the following manner:—When the grain runs in at the top it passes down the spouts, F, into the drying room or grain bin; now, when the hopper is full it falls and opens the slides, G, at the bottom, through the action of the levers and rods, H and I, so that the grain is discharged into the troughs, J, at the foot of which, outside the building, are placed bags or other receptacles to contain the grain. By this means the drying bins are always full; if some self-acting arrangement of this kind were not applied the heated air would rush out of the holes in the top of the grain bins and escape, thus the operation would be costly and incomplete. In the engraving one side of the building is shown removed, to expose the interior; the fan is driven by a steam engine outside. A patent on this grain dryer is about to be issued. One of them has been in operation at A. E. Masters's elevator in Brooklyn since July last, and it dries and cools 1,500 bushels of grain per hour, so that it is in perfect condition to be shipped on voyages of any length. In this dryer the partitions are 40 feet high, 6 inches thick and 22 feet wide.

In Fig. 2 a section of a grain bin is shown, which is to be used either in connection with or separate from a hot-air blast. The ventilation is carried on through a series of perforated tubes which run from top to bottom of the bin, as shown in our engraving; these occupy only a small portion of the space—in a full-sized bin but the 1-144th part. The inventor says he has thoroughly tested the utility of this dryer, having filled a bin 12 feet square and 25 feet deep with new damp corn on the 20th of November, 1861, and found it perfectly sound and dry in the ensuing August. When filled with corn heated by laying long in piles, the contents of this bin will be found quite cool in from six to eight days. The perforated tubes in this bin are to be replaced hereafter by others made of wire, by a machine specially invented for the purpose. This plan for drying grain needs no special apparatus, as does the first one described, and every farmer should consult his interest by adopting it. Sour and musty grain is impossible in this system of ventilation, and no matter what quantity or what the size of the bin is, the contents will always be preserved in marketable condition. The patent on this bin was procured Oct. 20, 1863, and on the automatic grain dryer, first described, Feb. 10, 1863, by Sylvester Marsh, Esq. For further information address the inventor at Box 3,047 Postoffice, New York City.

Fig. 1





MARSH'S AUTOMATIC GRAIN DRYER.

Woolen Factories.—There are 154 factories, with 999 sets of cards in Massachusetts, 56 in New Hampshire, with 228 sets of cards, 32 in Maine, with 32 sets of cards, 208 in New York State, running 541 sets of cards, 56 in Vermont, with 122 sets of cards, 56 in Rhode Island, with 225 sets of cards, and 93 in Connecticut, running 409 sets of cards.

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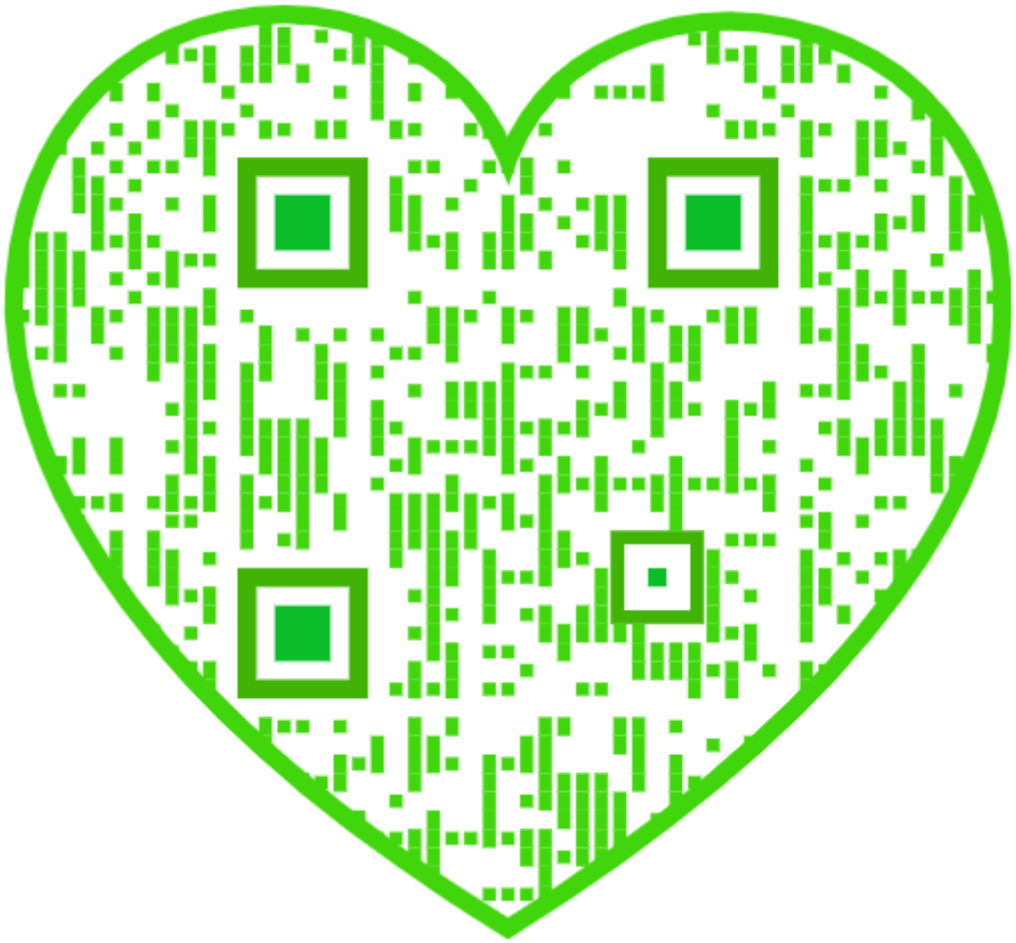

MAGNETO-ELECTRICITY FOR LIGHT-HOUSES.

A very interesting paper was lately read before the Society of Arts, London, by F. H. Holmes, Esq., on the application of the electro-magnetic light to light-houses; he gives a brief history of sea-coast lights, and we produce the substance of his paper as follows;—

"Formerly light-houses were few, and the lights consisted of coal or wood fires, kept up on high cliffs or towers. But as shipping increased, the light-house system was developed; and the coal fires gradually gave way to oil lamps, with spherical mirrors behind them as reflectors; these were then superseded by parabolic reflectors, and most recently the 'Fresnel lens' has taken the place of the reflectors. This lens has been increased in size, so that in first-class light-houses its diameter is 6 feet, hight 10 feet, and the size of the oil lamp used has been increased in proportion. The lamp has four concentric wicks, the largest of which is about 4 inches in diameter. The Fresnel lens consists of a middle refracting belt and a double series of reflecting prisons or zones; when properly constructed it has the property of collecting all the rays into one horizontal beam, so that all the light from the lamp is utilized by its rays being thrown directly forward. Whether a large or a small lamp is employed, it makes no difference in foggy weather, while the thickness of the flame is the same. Quantity of light does not add to the penetrating power in a mist. The great object now with those who are devoting attention to the improvement of light-houses is to obtain a light of great intensity to penetrate further into mists, and electricity has been found to be the most intense artificial light known. But to be effective and reliable it must be steady. Frictional electricity produces a succession of intensely vivid flashes, and might be used for the purpose in a perfectly dry atmosphere; but the slightest moisture conveys the charges to the earth. The electric light obtained from a galvanic battery is intense, but the current is not constant; it becomes weak as the solution in the battery becomes saturated by the decomposition of the elements. Currents of electricity can also be produced by the magneto-electric machine, for which no battery is required, and a constant current can be obtained while the helices of the machine are made to revolve with uniform speed.

"The electricity derived from a magneto-electric machine is induced in coils of wire, by the changing of the magnetic polarity of pieces of soft iron enclosed within the helices, and the quantity or intensity of the induced current depends, first, on the amount of magnetism induced in the soft iron; secondly, on the facility with which the poles of the magnetized soft iron can be reversed; thirdly, on the velocity with which the change of polarity takes place, and fourthly, on the length and thickness of the wire forming the helices. The amount of magnetism induced in the soft iron depends on the size and force of the steel magnets employed, and on the weight and softness of the iron in the helices. In practice, the weight of the soft iron is limited by the weight of the steel magnets; for if too heavy, these will yield their magnetism too slowly. To facilitate the change of the poles, the soft iron cores of the helices are made tubular—the tubes being single, double, or treble; as it has been found by experiment that the same weight of iron, when thus divided, loses and takes magnetism in less time than in the solid form. The amount of electricity in such a machine depends upon the amount of magnetism taken up from the permanent steel magnets, and the soft iron takes time to become saturated with magetism. If the velocity of such a machine therefore be too great, there will not be sufficient time for the soft iron cores to become saturated. It is necessary, therefore, to ascertain the maximum velocity, which may be done by experiment. The length and thickness of the wire must be in accordance with the current required. A thick short wire forming the helices represents a galvanic battery, composed of a small number of large pairs of plates, while a long thin wire represents a battery composed of a large number of small plates. Thick short wires give quantity of electricity; long thin wires give electricity of intensity. From this it results that there are certain laws known by which a magneto electric machine can be made to give a current of any given amount of electricity, with any given ratio between its quantity and intensity. The current of electricity thus obtained is different from that of a galvanic battery. While the helices are revolving, the direction of the current is reversed, as the core of soft iron passes each consecutive pole of the steel magnets. Or the permanent steel magnets may be revolved, and the helices remain stationary. An improved machine of this character has been invented and employed for light-houses, by Mr. Holmes. The current is under perfect control, and is conveyed to carbon points; the light obtained is uniform and steady. Its power may be increased without increasing the size of the lenses, and its power may be so increased as to give sufficient light to read at a distance of twenty miles. In intensity for penetrating haze, it is second only to the sun, and it is so purely white that it can be easily distinguished from all other artificial lights. An objection has been made to this light, that, being so small, it would be altogether invisible at a considerable distance; and when we merely consider that the apparent size of distant objects depends on the visual angle, there seems to be some ground for the objection. But the law of visual angles does not apply in the case of self-luminous bodies, as can be demonstrated with a piece of fine wire, which is almost invisible even with a strong light thrown on it; but by a current of electrity it is made self-luminous, and appears gradually to increase in diameter as it becomes brighter. The last point to be considered is the cost of the magneto-electric light as compared with oil. The French director-general of lighthouses has made a report to his government both as to first cost and as to cost of maintenance; both are greatly in favor of the magneto-electric light; of course, in making their calculations of cost, they take the cost of an equal quantity of light in each case, that is, by oil and electricity.

"This light has been in constant use in Dungeness light-house on the English coast, since June 1862. There are two small lenses in the lantern, and two regulators to each. Only one light is shown at a time, but there are two regulators for each lens, so that an instantaneous change from one to the other can be made without extinguishing the light when fresh carbons are required. In the machine room there are two magneto-machines, each capable of giving a powerful light, though both are in constant use. There is a direct-acting steam engine attached to each machine, and two Cornish boilers, each capable of generating steam enough for the two engines. The material consumed at Dungeness is about 30 to 35 pounds of coke per hour, and $5\frac{1}{2}$ inches of graphite in the regulator per hour. The principal item of expense is at present, the engineer, who has charge of the apparatus. The magneto-electric machines at Dungeness contain 120 horseshoe-magnets of about 50 pounds each, and 160 helices. This light has been seen by the captains of steamers at a far greater distance than that of the oil light. Professor Faraday, in his reports laid great stress upon this. All that was necessary was to double the number of magnets, and practically this was easily done, because there were duplicates of everything in such lighthouses, and in foggy weather it was possible to bring the power of both machines to bear upon one instrument; and in that way double the intensity of light could be obtained. In France a double light of this description has been ordered to be placed at Cape La Heve near Rouen. The cost of this light compared with oil had been gone into by M. Regnault, director-general of light-houses in France, and he had calculated very fairly on the principle of light for light; and reckoning in this way, including the expenses of alteration, taking down the large lens and putting in two smaller ones, putting up the apparatus, two steam-engines complete, and the buildings to contain them, the whole of the cost was calculated at half that of an ordinary first-class light-house, light for light. The actual expense was greater than in an ordinary light-house, but when the quantity of light was considered, it was less by one-half, whilst the working expenses were only one-third. The light at Dungeness was equal in quantity to fourteen of the large oil lamps with four concentric wicks. The power which this light possessed of penetrating to a great distance constituted its superiority to any system of lighting now in use. Of all the lights produced by chemical means, that of the combustion of hydrogen and oxygen gases upon a ball of lime was the most intense; but electricity is far more intense than any chemical action."

Photo-Sculpture.

The *Journal of the Society of Arts* says:—References from time to time have appeared in the papers respecting this novel application of photography. Preparations are being made in Paris for carrying it out on a very extensive scale. The results are stated to be very successful. The *modus operandi* will be very easily understood. The sitter or object to be sculptured is placed in the center of a well-lighted, spacious apartment; twenty-four or even a larger number of cameras are ranged around him, at equal distances from each other, with plates duly prepared, and by a simple mechanical arrangement the operator, by one movement of the hand, simultaneously uncovers all the lenses, and after a sufficient length of exposure closes them. The plates are then developed in the usual manner, a sufficient number of operations being employed for the purpose, and proofs are subsequently printed. There are thus obtained twenty-four or more views of the subject from twenty-four or more different points of sight. Each view is then in succession, by means of a magic lantern arrangement, thrown upon a screen on an enlarged scale. In order to transfer these likenesses from the photographs to the modeling clay, an instrument on the principle of the pentagraph is then made use of, having a tracer at one end and a cutting tool at the other. The lump of modeling clay is fixed on a stand capable of turning on its axis, with divisions corresponding to the number of photographs employed, and is placed in a position so that while the tracer of the pentagraph passes over the outline of the photograph thrown on the screen, the cutting tool at the other end cuts the clay into the corresponding outline. The clay is then shifted, one division on its axis, and the next corresponding photograph thrown on the screen, and the operation repeated, and so on in succession till the clay has twenty-four or more outlines accurately transferred to it. It then only remains for the artist to connect these tracings or outlines on the clay, and, here, of course, his skill is shown. The artist thus has a large amount of work mechanically and rapidly prepared for him, and he is enabled, in a comparatively short time, to execute a model combining all the truthfulness of mechanism and the skill of the artist. From this model casts in plaster, or statues in marble, can be taken in the usual way. It is stated that the sculptures thus produced are remarkably good, and can be supplied at a very cheap rate, as compared with sculpture produced entirely by hand.

The Bouquet in Wine.

An experiment, interesting to wine drinkers, has been lately made by M. Bertholet, the celebrated professor. It was he who first discovered that there is a particular oxydable principal in Bordeaux and Burgundy wines to which he attributes their flavor. In pursuing his studies he was induced to examine the influence which oxygen exercises over wine. The result convinced him that this action is most unfavorable, and that it entirely destroys the bouquet, which is replaced by a most disagreeable flavor. M. Bertholet found it sufficient to pass a current of oxygen into the choice wines of St. Jean and Thorin to produce this result, and demonstrate experimentally that a very small quantity is sufficient to destroy the bouquet of a quart of Thorin, and that the absorption of oxygen by wine, accelerated by the elevation of the temperature, is rendered almost immediate by the addition of an alkali.

The observations of this distinguished chemist prove how necessary it is to preserve wine in a perfect state from the action of the oxygen contained in the air, since the prolonged contact of 10 cubic centimeters of oxygen—that is, 50 cubic centimeters of air—is sufficient to destroy the bouquet of a quart of wine. It is to the slow penetration of oxygen into bottles that M. Bertholet attributes the destruction of flavor which every wine experiences at last. The reason that the racking off of new wine from the vat to the cask does not produce a similar result is that new wine being saturated with carbonic acid, disengages a portion of it when exposed to the air, so that it is in a great measure preserved, a very small volume of air disengaging a considerably greater volume of carbonic acid. The decomposition of wine in bottles half full, and the diminution of the flavor, well known to all connoisseurs, are caused by the action of oxygen. The complete destruction of the flavor of

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wine by the addition of an alkaline mineral water, such as that of Vichy, is explained by the preceding facts.

DEATH OF THACKERAY.

This eminent English novelist died suddenly in his bed some four weeks since,—the precise date has escaped us. The *Times* gives the following account of his last hours:—

"He was suffering from two distinct complaints, one of which has now wrought his death. More than a dozen years ago, while he was writing 'Pendennis,' it will be remembered that the publication of that work was stopped by his serious illness. He was brought to death's door, but was saved from death by Dr. Elliotson; to whom, in gratitude, he dedicated the novel when he lived to finish it. But ever since that ailment he has been subject every month or six weeks to attacks of sickness, attended with violent retching. He was congratulating himself the other day on the failure of his old enemy to return, and then he checked himself, as if he ought not to be too sure of a release from his plague. On Wednesday morning the complaint returned, and he was in great suffering all day. He was no better in the evening, and his servant, about the time of leaving him for the night, proposed to sit up with him. This he declined. He was heard moving about midnight, and he must have died between two and three in the morning of Thursday. His medical attendants attribute his death to effusion on the brain. They add that he had a very large brain, weighing no less than 58½ oz. He thus died of the complaint which seemed to trouble him least. He died full of strength and rejoicing, full of plans and hopes. On Monday last he was congratulating himself on having finished four numbers of a new novel; he had the manuscript in his pocket, and with a boyish frankness showed the last pages to a friend, asking him to read them and see what he could make of them. When he had completed four numbers more he said he would subject himself to the skill of a very clever surgeon, and be no more an invalid. In the fullness of his powers he has fallen before a complaint which gave him no alarm."

COLD WEATHER AND STEAM ENGINES.

During the winter much more care is necessary to preserve steam engines from injury than in milder seasons. Feed pumps are particularly liable to be damaged by frost, and much delay and expense results from inattention to them. Every pump should be provided with a small cock, so that the water could be drawn off every night, and the same should be left open so that no driblets or leaks from the suction or supply pipe could run in and cause damage, as pumps are so situated that this might occur sometimes. A steam cylinder needs a warm coat in winter as much as a man does, and if at no other time of the year, the pipes and all other parts containing steam should be "lagged" or felted heavily, as the loss by radiation is something to be considered. Engineers who pride themselves on a good reputation in small bills for fuel and supplies, should see to it that they do not overlook this matter. It is no argument to say that the engine room is itself warm enough, for this is not so; heat is radiated from all bodies, whether their temperature be the same or nearly the same as surrounding bodies; for it is the tendency of heat to place itself in equilibrium. The strain on a feed pump, induced by freezing the contents, amounts to one-eleventh of their bulk, as water expands in that ratio by freezing. An unloaded shell, it is said, was once filled with water and exposed during a cold day. The hole was stopped with a plug, which was thrown violently out of the shell, when the water froze, to a distance of 400 feet, while a cylinder of ice eight inches long protruded from the aperture. This experiment is one easily tried by our soldier mechanics, and though it may not be entirely successful, it serves to illustrate the force with which freezing water expands. In excessively cold weather, where steam boilers are allowed to get entirely cold over night and are fired up again in the morning, they will soon become leaky; as the constant extremes of expansion and contraction tend to produce that effect. An immense amount of fuel is wasted every year, even with the most careful supervision; but the quantity becomes enormous when little or no care is taken to prevent loss. In the winter this is particularly the case, and some steam pipes are as cold as if they had never had a pound of pressure in them; the result is easily seen at the end of the year.

NEW YORK STATE STATISTICS.

Information of a very interesting character is contained in Governor Seymour's late message. During the year 1863, the total amount expended for common schools was $3,854,900; the total number of children attending during the year was 887,570, out of 1,356,900 persons between the ages of 4 and 21 years. The number of teachers employed is 26,213, in 11,749 school houses; and there are 1,175,335 volumes in the District Libraries.

On the 30th Sept., 1863, there were 309 banks doing business in the State, with an aggregate capital of $109,258,147. Seventeen national banks have been established with a capital of $2,140,000.

About 8,000,000 bushels of salt were made at the Onondago Salt S rings last year, the increase over 1862 being one million of bushels.

The receipts of the general State fund amounted to $7,821,891, and the expenditure to $9,836,291, being a deficit of over one million of dollars.

Appropriations for bounties to volunteers, for sick and wounded soldiers, harbor defenses, etc., amounting to $5,337,000, were made by the last Legislature. Of this, $2,100,000 have been drawn.

The receipts for canal tolls in 1863, were $4,645,095—a falling off of more than half a million of dollars from those of the previous year. The expenditures for canal repairs and salaries of office-holders, amounted to $4,435,955.

The freight carried on the canals amounted to 5,400,000 tuns; on railroads, 4,720,602 tuns, and the value of property carried on, is estimated at $447,680,000.

Wealth and Population of New York City

The inaugural message of Mayor Gunther, contains some information of very general interest. New York is the largest city on the continent of America, and the third city in point of population in the civilized world. In 1840 the population was 212,852; value of real and personal estate $252,233,515; taxes levied $1,354,835. In 1850, the population was 515,394; valued real and personal estate $286,061,816; taxes $8,230,085. In 1860, population 814,254; valued real and personal estate $577,530,956; taxes $9,758,507. In 1863 the population was 1,000,000; valued personal and real estate $594,196,813; taxes $11,565,672. The expenditure of New York in proportion to population and wealth exceed those of any other city, and has been for years the source of much complaint. The total actual debt of the city is $19,929,441. There was an increase of debt in 1863 of $1,406,900. But the value of the real estate held by the city and pledged for the payment of the debt, is estimated at $40,000,000. A very large surplus fund is derived from the Croton water rents, and $2,579,534 has passed from this to the sinking fund for the redemption of the city debt.

Blockade Runners.

The commander of a blockade runner usually gets £800 a round trip from Bermuda or Nassau, and the privilege of purchasing twelve bales of cotton for £15 at Liverpool. It is only possible to make one trip during a month from Bermuda, but two could be made from Nassau. The risk to the commander is fearful, as the Federal cruisers are most dangerous to encounter. The instructions to commanders of blockade runners are to sink their ships rather than let them be captured by the Federals. Each blockade runner is well provided with boats, which can be lowered in a moment. These boats are provided with rowing and steerage gear, and with ten days' provisions. When there is no chance for the escape of the ship at night, the crew scuttle her and escape if possible to the boats; before the Federals can board the scuttled ship she is very often water-logged or sunk.—*London Times.*

THE English Admiralty have decided that the names of persons serving on any rebel vessel who belonged to the Naval Reserve shall be stricken from the list, forfeit all privileges, and not be allowed to re-enter the service.

Foreign Cotton.

Messrs. Mill & Bros., of Manchester, England, calculate that the cotton supply from all sources for 1864 will be about 2,825,000 bales, giving for consumption 51,100 bales weekly. It is expected that India will supply about 1,800,000 bales. The high price of cotton has stimulated its cultivation in many countries where it was formerly raised in very small quantities. If the present war was over, and cotton cultivated in the Southern States at as low prices as formerly, India, Egypt and other cotton countries would scarcely be able to withstand the competition, and the United States would again become the cotton garden of the world.

MISCELLANEOUS SUMMARY.

METALLIC FLAGS.—Mr. A. Watson, of Washington, D. C., has recently introduced a new metallic flag, which is highly spoken of by those who have seen it. The inventor says;—"These flags are more beautiful than bunting, or even silk; and as they cannot be injured by the most violent storms of wind, rain, snow, or sleet, they will in the long run be twenty times cheaper than bunting. They will also answer the double purpose of a flag and a vane, and may be used as a sign. They are always thrown to the breeze, wind or no wind, and are literally nailed to the mast."

COST OF CULTIVATING LAND BY STEAM.—A Mr. Smith, of Woolston, England, has published an account of the cost of cultivating land by steam for eight years, in which he says that the cost of preparing land for roots was, with steam, $2 88; with horses, $10 3; for barley two years, $2 16 with steam against $5 5 by horse power; four years for wheat, $50 20 by steam against the same for horse power, and foots up a total for a number of other articles, which shows a gain of 200 per cent in favor of steam. The writer says also that besides the economy of the plan he had much better crops.

STEAMBOAT ACCIDENTS.—The number of persons who lost their lives or were wounded by steamboat accidents in 1863 was 255 killed and 85 wounded; but although this is an increase of such accidents over the previous year, it is pleasant to record that the number is small in comparison with most former years. Thus, ten years before, in 1853, there were 319 killed and 158 wounded, and yet steamboats have greatly multiplied since then. In 1860, there were 579 lives lost and 134 persons wounded. Steamboat traveling in the United States is becoming far more safe.

A NOVEL SPECTACLE.—New York is a great place for sight-seeing. Passing up Broadway one day last week we saw a crowd of about fifty respectable-looking men surrounding an object that lay stretched upon the ground packed in blankets. Upon inquiring into the cause of the excitement from one of the bystanders, we soon ascertained that it was caused by an old gray horse, who was just breathing his last. Such scenes of attraction are now quite common in New York.

THE Montauk nation of Indians, once one of the most powerful in America, has dwindled down to five persons. Their monarch, or the monarch of four of them, Sylvester Phare, keeps no standing army, the smallness of his revenue obliging him to dispense with that kingly luxury.

GREAT STEAMSHIP SPEED.—The steamship *Scotia*, of the Cunard line, on her late passage from New York to Liverpool, made the quickest Atlantic trip on record. From New York to Queenstown, Ireland, the passage was but eight days. To the Mersey the time was but eight days and 21 hours, including stoppages.

THE new French journal, *L'Æronaute*, which made its appearance a few weeks ago, is devoted to aerial traveling; its first part being ornamented with a very extensive engraving of balloons, parachutes, flying machines and other similar inventions.

THE number of steamers inspected in the United States during the last fiscal year was 933, with a tunnage of 405,000 tuns. The number of engineers licensed was 2,700. The number of boilers reported defective by the inspector was 55.

THE government employes at Sheerness, England, who assisted in fitting out the *Rappahannock* for the rebels, have been discharged for violation of the neutrality law.

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GOVERNMENT ORDNANCE EXPERIMENTS.

[OFFICIAL.]

Practice at Iron-Plate Target No. 45.

WITH RUBBER PLACED BETWEEN THE PLATES ON THE PLAN OF MR. J. L. JONES.

PENCOTE BATTERY, Oct. 3, 1863.

This target was made of four 1-inch wrought-iron plates and four sheets of rubber 1 inch thick, backed by 20 inches of solid oak and joined together with six 1¼-inch wrought-iron bolts with nuts. The plates, rubber and bolts were furnished by Mr. J. L. Jones, of St. Louis, Mo.

The first four inches nearest the timber were composed of alternate layers of rubber and iron, and then two sheets of 1-inch rubber and two 1-inch wrought-iron plates, the latter being on the outer surface of the target. The target was placed against a bank of solid clay.

DIMENSIONS OF TARGET.—Length, 96 inches; width, 42 inches; thickness of rubber and plates, 8 inches; thickness of timber, 20 inches.

Gun XI. inches, No. 214, C. A. & Co., mounted on wooden pivot carriage in front of the battery. Charge, cannon powder. Projectiles, Cloverdale cast-iron, Primers friction.

No. from Gun.	No. to-day.	Charge.	Weight of Projectile.	Insertion	Recoil.	Time Fired.	Distance to Target	REMARKS.
		lbs.	lbs.	in.	ft.	P.M. h.m.	ft.	
	1	30	169	104	6·9	3.41	84	

This shot struck 20 inches from the right edge and 28 inches from the lower edge of the target, passing entirely through the plates, rubber and timber, and penetrating the bank a distance of 12 feet. Diameter of the shot hole 11¼ inches.

The timber in rear of the target around the shot hole is much broken. The plates are sprung outward, directly around the shot hole, 1 inch. All the bolts were slightly started, but none broken.

On the 6th inst., the target having been placed on its longest edge at an angle of 45° with the line of fire, another shot was fired at it from the same gun and under the same conditions, and with results as follows:—

No. from Gun.	No. to-day.	Charge.	Weight of Projectile.	Insertion.	Recoil.	Time Fired.	Distance to Target	REMARKS.
		lbs.	lbs.	in.	ft.	P. M.	ft.	
	1	30	169	104	4·6	3·40	84	

This shot struck 15 inches from the top and bottom edges, and 37 inches from left edge of the target, passing entirely through plates, rubber and timber, and penetrating the bank a distance of 6 feet. The shot appears to have been broken in its passage through the target, as several small pieces were taken out of the shot hole, and one small piece was found in the rear of the target, on the bank. Horizontal diameter of shot hole, 18¼ inches; vertical, 12½ inches.

The plates were sprung inward on the right edge of the shot hole half an inch, and on the left edge three-quarters of an inch. The plates have sprung forward on the right and left edges of the target half an inch. The timber in the rear of the target is completely shattered. No bolts were broken, but all are more or less started from the surface of the plates.

Practice at Iron-Plate Target No. 46,

FOR COMPARISON WITH J. L. JONES'S TARGET, NO. 45.

PENCOTE BATTERY, Oct. 3, 1863.

This target was made of four 1-inch wrought-iron plates (Abbott's), backed by 20 inches of solid oak, and joined together with ten wood-screw bolts. The target was placed against a bank of solid clay.

DIMENSIONS OF TARGET.—Length, 96 inches; width, 48 inches; thickness of plates, 4 inches; thickness of timber, 20 inches.

Gun XI. inches, No. 214 (C. A. & Co.). mounted on wooden pivot carriage in front of the battery. charges of cannon powder; projectiles, Cloverdale cast-iron solid shot. Primers, friction.

No. from gun.	No. to-day.	Charge.	Weight of Projectile.	Insertion	Recoil.	Time Fired.	Distance to Target	REMARKS.
		lbs.	lbs.	in.	ft.	P. M. h.m.	ft.	
	2	30	168	104	4.10	3·55	84	

This shot struck 23 inches from the right edge and 21 inches from the lower edge of the target, passing entirely through plates and timber and penetrating the bank a distance of 5 feet. Diameter of shot hole 12 by 14 inches.

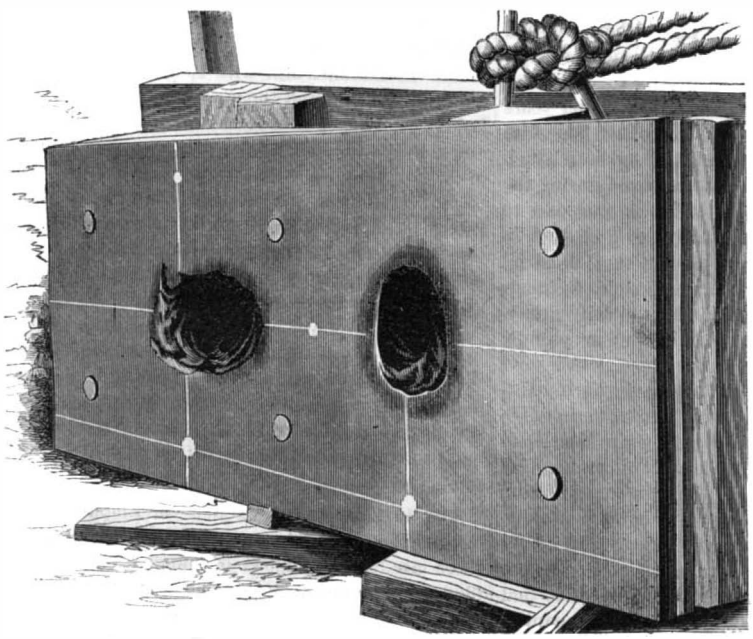
The plate is sprung inward on the left edge of the shot hole 1½ inches. The timber in the rear around the shot hole is much broken. One bolt was started forward 1⅝ inches, and five others slightly started, but none were broken.

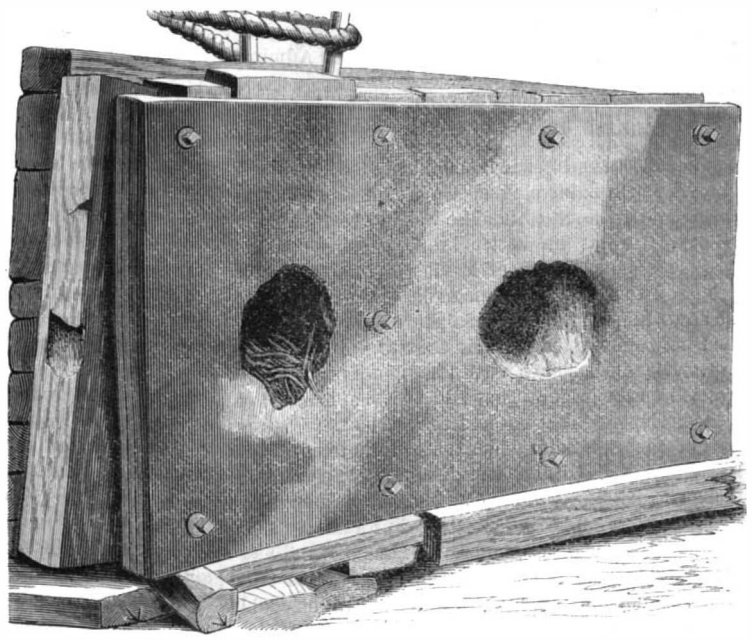
On the 6th inst. the target having been placed on its longest edge, at an angle of 45° with the line of fire, another shot was fired at it from the same gun, under the same conditions, with results as follows:—

No. from Gun.	No. to-day.	Charge.	Weight of Projec. tile.	Insertion	Recoil.	Time Fired.	Distance to Target	REMARKS.
		lbs.	lbs.	in.	ft.	P. M. h. m.		
	2	30	169	104	4·06	3·53	84	

This shot struck 19 inches from the top, 14½ inches from the lower edge, and 56½ inches from the left edge of the target, tearing through the plates and the shot breaking into pieces, part of which glanced off at an angle of 45°, and penetrated the bank on the right of the target, the remaining portion (43 lbs.) remained in the shot hole. Horizontal diameter of shot hole 16½ inches, vertical 14¾ inches.

The plate is sprung inward on the right edge of the shot hole 3 inches, top edge 2½ inches, lower edge 2½ inches. The plates have sprung forward on the top edge 2½ inches. One bolt was started forward three-quarters of an inch; none are broken excepting the one in the center of the shot hole, The plates are cracked around the shot hole, one crack extending 8 inches. The timber is all completely shattered.





The experiment with this target was for comparison with Mr. J. L. Jones's target (composed of four 1-inch iron plates and four 1-inch sheets of india rubber), to obtain the relative resistance. The conditions of the two experiments were identical. The penetration of the projectile fired at this target was five feet from the face, while the penetration of that fired at the iron and india-rubber targets was twelve feet. In the second experiment, oblique firing, 45°, the shot at this target did not penetrate entirely through, and 126 lbs., of it were thrown out at an angle of about 45° into the bank of earth, while the corresponding shot at the iron-rubber target passed entirely through it and penetrated the bank of earth a total distance of 6 feet from its face.

The shot hole in the direct firing at the iron-rubber target is circular, and differs but 45 inches from the diameter of the projectile, while the corresponding shot hole in this target is irregular, and differs 2·20 and 4·20 inches. In the oblique firing it will be observed that the horizontal diameter of the shot hole in the iron rubber is the longer, while the vertical is shorter than those of this target; in both instances the face plate of the latter appeared to be slightly more damaged than the former. Whether it be the action of the rubber or difference in the character of the iron, it is difficult to determine.

Obstructions in Charleston Harbor.

A correspondent writing from Morris Island says:—

"In the Quartermaster's possession, on this island, are great masses of the 'obstructions' with which the beach has for some time past been lined, to the great impediment of locomotion and transportation. In addition to the huge rafts and linked railroad bars, are immense beams, squared on four sides, to fit into clamps of wrought-iron. The intention seemed to be that these clamps should fit loosely around the beams to allow them play. The bar iron of which they are wrought, is one and a half inches wide and half an inch thick, and is of excellent quality. To the clamp is attached an iron ring-bolt, strong and massive, intended to bear the weight and strength of the railroad bars. Thus, it appeared that each alternate bar was affixed to a clamp and ring-bolt. The intermediate bar was linked or hinged to the extremity of the next. The squared timbers were evidently intended to support the bars suspended in the water beneath them. Thus, rafts made of four squared timbers, fifty feet long and at least fifteen inches in diameter, either way, were lashed transversely to four pine sticks or perfect trees. These formidable rafts, secured by strong lashings and chains to each other, stretched across the North Channel of Charleston harbor. They only gave way to the constant swaying and surging of the tempestuous waves; but, once loose, the great currents and high tides brought them to us, and cast them like mere drift-wood at our feet. The beams, now lying in the yard of the Quartermaster's store on Morris Island, are worm-eaten through and through. The far-famed waves of the Euxine are not more destructive to vessels than are the wrigglers of these waters. Wherever a little copper sheath-

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ing becomes displaced from the bottom of a timber ship, the worms get in, and work through, after them the water insinuates itself. Leaks and foundering are the next consequences in strictly natural series.

In one mass of obstructions hauled away from the beach of Morris Island, are 16 bars of T-iron rails, each 23 feet in length. So great was the weight of the mass that the bars to which the hawser was attached were bent to a curve of about 35°. The hawser, a new one of six inches circumference, was stretched out to only four inches. Fifty men were occupied four days in hauling out of the tide-water the mass I have described. Before the other obstructions can be removed the drifting sands will bury them, and they will be lost forever. The obstructions being removed by natural causes, nothing now prevents the taking of Charleston whenever the Admiral wills it."

PROGRESS OF ENGINEERING SCIENCE.

The above forms the text of an elaborate and able article in the *Quarterly Review*. From this we select several extracts which will be read with interest by all :—

Water-Pressure Engines.—Recently a new application of water power has been effected by the inventive genius of Sir W. Armstrong. He first applied it at Newcastle, where the general level of the town is very much above that of the wharves of the harbor, and the waterworks in consequence provided a very tall column of water at the lower levels. Of this he availed himself by applying the pressure so obtained to force a piston along a water-tight cylinder, and with a simple multiplying gear the cranes on the quays were made, by the mere turning of a cock, to raise any weight their construction could support. By applying the water power alternately on both sides of the piston, and acting on a cranked axle—as done in the steam engine—a water engine was next invented, capable of exerting any amount of power that could be obtained from the hight of the column of water and the amount of supply. When a sufficient head of water is available, or where the work is intermittent, this is certainly one of the most successful applications of water power yet invented. At Great Grimsby Dock, and at Birkenhead, pipes are laid under the pavement from a reservoir at the top of a tall tower, to every part of the dock premises. At the foot of every crane, under the piston of every hoist, at every dock gate, unseen and noiseless, the power lies dormant; but a woman's hand, applied to a small handle, will set in motion a force sufficient to raise a mass weighing fifty or one hundred tuns, either to place it in the hold of a ship, or deposit it in any spot within reach of the arms of the crane. With equal ease the gates of locks 100 feet in width are opened or shut and the smallest as well as the heaviest works of the dockyard done, without a stranger being able to perceive what it is that sets everything in motion.

As an accumulator of power, Bramah's hydraulic press surpasses anything that has yet been invented, and may be carried to any extent that the strength of the metal will stand. The presses which were used to raise the tubes of the Menai Bridge when worked by a 40-horse power engine, were capable of exerting a power equal to that of 14,200 horses, and raised one-half the tube, or 900 tuns, slowly but steadily, through the 100 feet at which they were to be placed above the level of the water.

Air-Pressure Engines.—The tunnel under Mont Cenis is to be rather more than seven miles and a half in length, and as it is one English mile below the summit of the mountain, no air-shafts could be sunk from above;and the first difficulty was to ventilate a cul-de-sac, that at one time, at least, must be nearly four miles in length. This has been accomplished most successfully by M. Someiller, the engineer, availing himself—on the Italian side—of a stream of water 80 feet above the mouth of the tunnel. This is used to force air into a chamber, where it is kept at a constant pressure of six atmospheres, by a stand-pipe 165 feet (50 meters) in hight. From this it is conveyed in pipes to the innermost end of the excavation, where it is set to work to bore holes in the face of the rock for blasting purposes. There are eight perforators, each of which sinks ten holes three feet deep in the face of the rock in six hours. It takes some time to dry each of these and to charge it with gunpowder; and it takes four hours to clear away the *debris* and to make all ready for commencing another set of perforations. So that practically only two sets are bored in twenty-four hours, and the progress is consequently 6 feet per day. At each blow on the head of the jumper a portion of the compressed air escapes, as steam does in a high-pressure engine. Its expansion is sufficient to cause a draft outwards, and keep the place perfectly ventilated; and even immediately after a blast, the tunnel is freed from the effects of the explosion very rapidly, and no inconvenience felt. By improvements in the machinery, the engineer hopes to bore one set of holes in eight hours; and as the more work it does the more air it blows off, not only will the work be expedited, but the ventilation improved by the more rapid working.

The Steam Engine.—Without doubt the invention of the steam engine is the greatest mechanical triumph which man has yet achieved. Although the invention of a practical engine is hardly more than eighty years old, and it is little more than half that time since its real value came to be appreciated, the mode in which engines have been multiplied and improved during the last forty years, and the thousand new purposes to which they have been and are daily being applied, is perhaps the most extraordinary fact in the industrial history of the world, It certainly is the one, the magnitude of whose results we are the least able to grasp. One of the greatest advantages of the steam engine, besides the power of placing it anywhere, is the wonderful flexibility with which it can adapt itself to almost any work it is set to perform. The difference between an elephant and a race-horse is not greater than between a Cornish pumping engine and an express locomotive. The perfection of the former arose from the necessity of importing every ounce of fuel to be used in Cornwall, and frequently of carrying it for miles over bad roads. This set engineers calculating how fuel could be saved, and with such success, that at one time a pound of coals did twice the quantity of work that it did elsewhere, though this difference is fast vanishing now. To any one accustomed to the noisy activity of most marine or manufacturing engines, nothing can be more remarkable than the sleepy quiet of Cornwall. The fire-bar area is so great, and the boiler arrangements so roomy and so carefully appropriate, that all the fuel and all the smoke are consumed, and none issues from the chimney. In the engine room nothing is seen but one great cylinder, hooped with wood, and looking more like a beer-vat than a part of an engine, and almost as cool to the touch. A few slender bright rods extend from the roof through the floor, and to these are attached some delicate bright handles, of rather fanciful forms, but these suffice to open and shut its valves and to regulate its expansion. As the stranger enters, all is quiet and at rest; no burst of smoke, no smell of oil, no escape of steam, and no noise; presently there is a click click among the handles, the great beam lazily raises itself and lifts 100 or 200 fathoms of heavy pit work some ten feet upward, and then as quietly drops it again into its place. Having done this giant's work it goes to sleep again for ten or twenty seconds, as the case may be, till called upon to make another effort. This it repeats at stated intervals during the whole twenty-four hours, week after week, or for months together, without rest or intermission.

Contrast this with the express engine, rushing past at a speed of fifty or sixty miles an hour, making 1,000 or 1,200 pulsations in a minute, consuming coals with reckless wastefulness, and casting its vital heat and life's blood to the four winds at each beat of its valves. Nothing that man has done comes so near to the creation of an animal as this—even the most unimaginative can hardly help drawing comparisons between the steam horse and his quadrupedal competitor. There is indeed more in the comparison than appears at first; especially when we see the monster fed with great spoonsful of cooked black vegetable food, from which it evolves its vital heat in its capacious lungs, which, after circulating through its tubular veins, is launched into the air with the waste products of combustion.

In this as in most things, the steam engine is strictly original, and, strange to say, no new principle has been invented since Watt left it, and no new form added which he did not at least foresee. The immense progress that has been made since his day has been due to the daily growing perfection of workmanship, and more perhaps to the careful adjustment of every part, and of every engine to the exact special work it has to perform. The progress is practically due to the knowledge which is obtained by the daily experience of those who watch the working of all these engines, from those which make three strokes in one minute, to those that make 1,000 in the same time, as well as all the intermediate grades between these two extremes, which are hourly performing every class of work under the most completely various circumstances.

There does not seem to be any theoretical limit to the size of a cylinder of a steam engine, or consequently to the power that may be given to it; but, practically, it is generally found more expedient to use two or more engines to do a given amount of work than to increase to any very great extent the power of one. Pumping engines with cylinders 100 inches in diameter and with 10 feet stroke, are common in Cornwall, and those used to drain the Haarlem Lake were 14 inches in diameter; and in the *Warrior* and *Achilles* the pair of engines are nominally 1,250 or 1,300 horse-power, but really work up to 5,000 or 6,000 horse-power. When more than this is wanted, it may be expedient to divide it, as was done in the *Great Eastern*, between two sets of engines; for it is not only the cylinder, but the crank shaft, and all the gear, that require to be increased in the same ratio. Although the power of our factories to produce the immense forgings requisite for these purposes has been increased tenfold within the last thirty or forty years and is daily increasing, there are inconveniences in dividing power, where there is room to do so, that will probably prevent any great increase in this direction.

The Cotton Manufacture.—In England it is calculated that, when the cotton manufacture is thriving, there are thirty millions of spindles constantly employed in spinning cotton alone, so that if every man, woman and child in the three kingdoms were to devote twelve hours a day to this occupation, they could not effect as much; and it would require another population of nearly equal extent to prepare the cotton for the spindles, and a very large number of persons to supply the place of the 300,000 power-looms that are employed to weave it, and to supplant all the mechanical appliances that finish it and fit it for the market. All this is required for cotton; but when we add to this the amount of power employed in spinning and weaving flax and wool, and all the different classes of fibers which we have enlisted in our service, the power employed in cotton alone sinks to a mere fraction.

Steamships.—Till the invention of the compass, long sea voyages were of course impossible, and large vessels were consequently not needed for commercial purposes; but the discovery of the uses of a keel, or something to enable a vessel to hold a wind, even if she could not beat to windward, was almost as important, for propulsion by oars must always have been very expensive and inefficient in large vessels. An immense impulse was also given to the improvement of vessels by the discovery of America, and of the passage round the Cape, and since then the progress has been rapid and steady; but it was not till propulsion by steam cleared the problem of all extraneous considerations of weatherlyness, steadiness and handiness in maneuvering, &c., that marine architects fairly grappled with the subject.

In order to explain the problem the shipwright has before him, it may be necessary to state that a vessel, for instance, of 1,500 tuns, 36 feet beam, 250 feet long, and with 20 feet raft, displaces 20 tuns of water for every foot she moves forward, and the question is what is she to do with this? If she heaps it up before her, as the old bluff-bowed vessels did, she has not only to climb over it, but she has wasted an enormous amount of power in lifting what she might have left lying. As every contractor knows, he is paid the same for wheeling stuff twenty yards forward as for raising it one yard high; and what the naval engineer seeks to do is to spread his displaced water laterally, evenly and flatly, over as large a surface as possible. The progress already made in this direction will be understood if we take, for instance, the resistance of a square box as our unit. By simply rounding off the corners, the power requisite to force the box through the water is diminished by one-third; by introducing such lines as were usual in the best ships thirty years ago, the resistance is lessened by two-

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thirds. Whereas now, in consequence of the improved lines which are mainly due to the long scientific investigations of Mr. Scott Russell and his coadjutors, the resistance is only one-twelfth of that of the box first mentioned; and this fraction may before long be reduced to one-twentieth or even one-twenty-fourth. The consequence of this is, that twenty years ago engines of 500-horse power barely sufficed to drive a vessel of 1,000 tuns burthen ten knots through the water; the same engines would now propel a vessel of 1,500 tuns at least fourteen knots; and better results than this are being attained. Already twenty miles an hour has been reached, the Holyhead packets working steadily at that rate; and even an armed dispatch vessel has just left this country for China, which, with all her armament on board, can do as much, and that without any extraordinary exertion. Having reached this speed, we cannot long be content with less. Vessels must cross the Atlantic at the rate of 500 miles a day. It would be expensive to build a vessel to do this to-day, and it might be at some waste of power she would accomplish it; but day by day it is becoming less difficult, and before long it will be easy. Had the *Great Eastern* been built for speed alone, she could easily have accomplished this; but carrying power was her great object, and her calculated speed was 15 miles, which she accomplishes with singular evenness in rough weather as well as smooth. She has run 475 miles in twenty-four hours, but her average speed is about 360, or 15 miles per hour, or about the average speed of the best ocean steamers of the present day. This they accomplish easily, without the sacrifice of any of their qualities as sea-going vessels, while retaining the capability of accommodating a large number of passengers, and a considerable amount of cargo for a voyage of 3,000 miles—the distance (speaking in round numbers) of New York from Liverpool.

But it is not only in speed that such progress has been made, as vessels have increased in size in even a greater ratio. Thirty years ago 1,300 tuns was the measurement of our largest indiamen, and 2,000 tuns of a first-class line-of-battle ship. We were all astonished some ten years ago when we heard of the *Duke of Wellington* being launched, of 3,800 tuns; and the *Himalaya*, of 3,600, built since that time, was the largest merchant vessel the world had ever seen. Now our first-class iron-plated frigates measure at least 6,000 tuns. The *Great Eastern* is 691 feet long, 83 feet wide, and registers 18,914 tuns, though her real capacity is nearer 25,000 tuns, and the indicated power of paddle-wheel engines is equal to 3,600 horses, and that of her screw to 4,800, making together 8,400 horse power. If she has not obtained, commercially, the success that was anticipated, it is not that our engineers did not know how to design and build her, or how to furnish her with the requisite power, but simply that she was born before her time. The world is not yet ready for vessels of her size. Without disrespect to any one we may say that until vessels of very large size become more common than they are, and until nautical experience has been enlarged by the use of such ships, there cannot be captains capable, in the highest sense, of commanding, or sailors and engineers sufficiently educated to work so gigantic a machine.

[To be continued.]

PHYSIOLOGY OF SWIMMING.—The medical authorities of the French army especially recommend that men inclined to disease of the chest should be made to swim. The following are the effects (which M. le Docteur Dulon attributes to swimming) on the organs of respiration:—A swimmer wishing to proceed from one place to another, is obliged to deploy his arms and legs to cut through the liquid, and beat the water with them to sustain himself. It is to the chest, as being the central point of sustentation, that every movement of the limbs responds. This irradiation of the movements of the chest, far from being hurtful to it, is beneficial; for, according to a sacred principle of physiology, the more an organ is put into action, the more vigor and aptitude it will gain to perform its functions. Applying this principle to nature, it will easily be perceived how the membranes of the chest of a swimmer acquire development—the pulmonary tissues firmness, tone and energy.

THERE is an American railway-car line in operation between the Place de la Concorde, Paris, and Sevres.

Correspondence

Heaton's System of Defensive Armor.

MESSRS. EDITORS:—In your paper of Jan. 2d, you make some remarks on my system of defensive armor, which is illustrated in that paper; though not in such a way as to convey to a great majority of your readers a correct idea of it. You show a turret, supposed to be plated on two systems, one side on my system, and the other on the present or all iron system. But in my system you show what ought to be a thick iron plate, as wood, which makes the thing contradict itself; for if that was wood no bolts would be broken, and none of the disastrous effects of concussion which you show would be possible.

What I claim is, that wood cannot be made to communicate fracturing force to iron, indirectly; wood can be shot directly through iron, but not indirectly. For instance: A shot strikes fairly against the side of a turret composed of all iron, the ball does not go through, and, from an outward view no serious damage is inflicted, a dent, perhaps two inches deep, being the only apparent injury. But to see the real extent of the damage you must look inside the turret, when you will find a bulge, which will be in size just in proportion to the size of the shot and the thickness of the turret, every plate from the point of the shots impact communicating the force to the next one to it, until the inside plates which are furthest from the shot and which would be thought by some to be least liable to injury, are injured the most; being strained beyond endurance they crack and burst open, breaking the bolts and communicating the force of the shot to the inmates, often more seriously than if the shot actually entered directly; a bolt-head being just about as likely to "put a man out of the fight," as a ten or fifteen inch shot, if it only hit him right. The object of my system is to "take up" or destroy the first or maximum force of the shot, with a material of softer nature than iron; which material shall, in so "taking up" or destroying the force of the shot, communicate no fracturing force to the real or "main armor," which is held in reserve and not opposed directly to the action of the shot. Is a ship plated to save the ship or the inmates from injury? Can a shot be thrown against the sides of an iron-clad structure with sufficient force to smash the shot to pieces, without injuring the surface against which it is broken? It cannot, I think, no matter how heavily plated, within reason. If it is injured, in order to keep the ship shot-proof, it must be repaired: which is the most readily and cheaply repaired, iron or wood? I claim that the wood I use, in addition to actually saving the "iron armor" from serious injury, takes the damage which must be received in arresting shot suddenly, and is easily replaced. Wood may be forced through iron, or a soft substance through a harder one, by a sustained power or a continued application of force; but not by a cannon ball, because it is not a "continued application of force." It is simply weight and impetus—the result of force, and the momentary application of it—but not the continued application of it; and by no such means as this can a soft substance be forced through, or made to communicate fracturing force to a harder one; because the soft substance must first be rendered as dense or hard as the harder one before it can either injure it or communicate injury to it. And in this compression or densifying of the soft substance the force of the shot is exhausted or "taken up," or so much so without being communicated to the iron as to allow of its being arrested, without any serious injury to the main armor, and without producing that shock or concussion which is the cause of breaking bolts. Wood may be shot directly through iron, because here you have its weight and velocity to arrest; but it cannot be indirectly forced through a harder substance than itself.

CHAS. W. S. HEATON.

New York Dec. 29, 1863.

[Since publishing the article referred to by our correspondent, we are in receipt of the official report from the Ordnance Bureau, of some experiments made with Heaton's target, from which it seems that his theory of construction is found wanting in practice. The official report will be published with illustrations, in the next number of the journal.—EDS.

Further Illustrations of the Electric Wave.

MESSRS. EDITORS:—In my first article on the Electric Wave, there were points not sufficiently elucidated, and one or two mistakes unnoticed were printed. The latter I will now correct, and the former explain more fully.

When I say "The electric current does not run in a line of narrow limits; neither does it run in a straight line," I mean no more than to say that it runs just as a cylinder of two feet diamater runs, when turned by a crank and pushed longitudinally at the same time. We turn from the left to the right. So rotates or turns also the electric current or wave—from the left to the right. This law, as it relates to the electric current, is universal. We see that the cylinder turns at its remote end simultaneously with its turning at the crank end. So, likewise, is the turning or revolving of the electric wave. In regard to the wave, however, if the line of its motion be extended to a great distance, the motion of the wave at its terminus is not *precisely* simultaneous with its motion at the commencement. This is owing to the obstacles it has to overcome in its long passage, owing to the imperfect conducting properties of the intervening media along which it has to pass.

While the electric wave is thus rotating, it generates at its central line of motion a current at a right angle with its motion; and this is magnetism. This magnetic force or current does not rotate, but runs in a direct course from one of its poles to the other, in a line the motion of which commences with that of the electric wave. This magnetic force or current is very strikingly exemplified in the helices of the ordinary electro-magnetic machines, where the iron wire that is introduced into them becomes powerfully magnetic, with its north and south pole.

Besides this rotary motion, the electric wave has also a lineal motion; that is, it moves directly forward simultaneously with its rotation; this constitutes a spiral motion.

There is something sublime in contemplating this wonderful force. In it there is found the epitome of the universe. Its rotary and lineal motions represent the motions of the heavenly bodies on their own axis, as well as their orbitual motions; the one confined to its own center, and the other rushing from it.

Electricity in motion begets magnetism; and magnetism in motion begets electricity. The two elements, although so intimately related to each other, are, nevertheless, totally distinct in their powers. Glass offers an insurmountable obstacle to the transmission through it of electricity; while magnetism passes through without the least resistance. The passage of electricity is instantaneous, leaving no traces behind of its presence. Magnetism, on the contrary, on certain metals, such as steel, remains in full force. Electricity gives, but loses while it gives; but, wonderful as it may seem, magnetism gives and loses nothing. With one magnet we may make a thousand, without its losing the least of its magnetic power. It seems to be a God-like power. "God," as we read, "created man in his own image." Gen. i. 27. Yet God is the same he was before man was created, so the magnet remains the same after making other magnets. It is, doubtlessly, these two great principles that sustain the universe, and impart and regulate all its motions.

SAMUEL B. SMITH.

ERRATA.—In my communication on the Electric Wave, which appeared in the SCIENTIFIC AMERICAN, Dec. 19th, 1863, the types make me say, "The electric wave extends twelve miles from its line of motion;" for *miles* read *inches*,—which is quite a difference.

A Bald Head.

MESSRS. EDITORS:—I am only 23 years of age, and during the past twelve months the hair on the top of my head has become very thin and continues to get thinner; so much so that I fear ere long I shall, like Cesar, wear my wreath of laurels (a wig, I mean,) to conceal my baldness. Please be so kind as to inform me, through the columns of your much-esteemed journal, of the best remedy to make my hair grow again.

J. M. J.

[We really sympathize with our correspondent in his affliction, but we fear that there is no help for his case. One of us has a head as bare as a pumpkin,

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we mean on the outside, and when we first discovered its approach we made a rush for hair restoratives, poultices, flying sinapisms—indeed anything to save us from a bald head—but in vain; we could neither coerce nor coax a spear of wool to grow where it ought to grow, and we have at last yielded to our bare-headed fate. Seriously, we do not think the thing can be done, and the advertised hair restoratives are usually money-traps, to gull the public; all certificates to the contrary, notwithstanding. A gentleman of our acquaintance has informed us that he has improved his hair crop by the free use of Castile soap and water with a generous rubbing—a simple remedy which it will do no harm to try.—Eds.

ANNUAL PETROLEUM PRODUCT.

A very full and interesting annual review of the petroleum trade is given in the *Shipping and Commercial List and New York Price Current.* From it we learn that no less than 28,000,000 gallons were exported during the year 1863. This export was as follows:—From New York, 19,547,604 gallons; Boston, 2,049,431; Philadelphia, 5,395,738; Baltimore, 915,-866; Portland, 342,082. In 1861, the total export was only 1,112,476 gallons; in 1862, 10,857,701 gallons. This trade has sprung into existence with such rapidity and attained to such dimensions, that it appears almost like the work of some great wizard. A few years since, some persons, while boring for water in an obscure Pennsylvanian valley, were surprised to find their labors culminating in an oil instead of a water-spout. The event caused great excitement; other wells were soon sunk, with like results, until finally the rocky chambers of that valley have become the natural laboratory which supplies all the rural mansions and cottages in America and Europe with beautiful artificial light to cheer the long winter evening hours. Next to gas, refined petroleum gives the most clear light, while it is also the cheapest ever used by man; we therefore hope, for the good of our fellowmen, that the supply of it will long continue to be copious.

Since petroleum was first introduced, great improvements have been made in refining it. Formerly it produced an offensive odor while being burned, and it was usually of a dark color. That which is now generally used is freed from disagreeable smell, and is as clear and colorless as water. The present price of the crude is 31 cents per gallon; refined, 53 cents. The quantity exported in 1863 amounted to 252,000 tuns weight, and engaged no less than 252 ships of 1,000 tuns burden each, to carry it. It has become one of the most important of our national products. The value of 28,000,000 gallons of the refined article is no less than $14,840,000, but not over one-half of the quantity forwarded was refined; still, with this allowance, our petroleum has brought the country $11,900,-000 during the past year—a snug little sum for such a young trade. While in conversation, a few days since, with a gentleman engaged in this business, he stated that the export for the next year would, in all likelihood, greatly exceed that of the past twelve months, and would probably reach forty millions of gallons.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week : the claims may be found in the official list:—

Deflecting Window for Railroad Cars.—This invention consists in having the frame of the car window hung on central pivots, and arranged in such a manner that it may be adjusted in an oblique position relatively with the car body, so as to deflect dust, cinders, &c., from the car while it is in motion and at the same time admit of a passage of air out from the car, and also admit of being so adjusted as to cause air to enter the car through the window when there is no dust to contend with. George Mann, Jr.; of Ottawa, Illinois, is the inventor of this improvement.

Horse Hay-fork.—This invention relates to a new and improved horse hay-fork, such as is used for elevating hay in barns. The invention consists in the employment of one or more spiral or screw tines attached to an arbor which is fitted in a suitable head having steady tines or ends attached to it, these parts being used in connection with a pawl and ratchet or other device to serve as a fastening for the above, all being so arranged that large loads may be elevated by the fork. T. H. James and H. James, of Stockport, N, Y., are the inventors of this improvement.

Nail Machine.—This invention relates to machinery for the manufacture of forged nails, more especially horse-shoe nails. In the manufacture of such nails by machinery it is difficult to produce as thin or fine a point as is desirable by a hammering or drawing operation. The plan adopted in this invention is to cut the points, after having reduced the nail as much as desirable by hammering or drawing. The improvement consists in the employment, in a machine for making forged nails, of cutters so constructed and applied that they will serve the purpose of cutting the metal from the side of the nail to reduce the thickness and produce the desired form of the point. It also consists in the employment, in combination with such cutters, of a moving finger or presser, so arranged in combination with a fixed guide as to press the nail against such guide and hold it in contact therewith, and in proper position during the operation of cutting the point, and so to act upon the point before or during the cutting operation as to bring it into line with the center of the nail when the cutting is completed. Daniel Dodge, of Keeseville, N. Y., is the inventor of this improvement.

Horse Hay-fork.—This invention relates to an improvement in horse hay-forks which are provided with a bail or sustaining bar, and a brace or toggle-joint bar, the latter serving to hold the fork in proper position while being elevated with its load, and admitting, when its joint is shoved out of line with the two parts or bars which it connects, of the load being discharged from the fork. These forks have been much used since being introduced to the public, and have given general satisfaction, the only material objection urged against them being the effort required to actuate the toggle-joint bar in order that the fork may discharge its load. The object of the invention is to obviate this difficulty, and to that end it consists in applying a lever to the fork in such a manner as to act against the toggle-joint bar, and cause the latter, with a quite inconsiderable effort on the part of the attendant, to be so used or adjusted as to admit of the load being discharged. J. D. Halsted, of Rye, N. Y., is the inventor of this hay fork.

Improvement for Removing Obstructions from Harbors and Rivers.—This invention consists in providing, in the interior of a vessel propelled by steam, sails or other means, a fixed working chamber with an open bottom and into which air is compressed as in a diving bell, to permit persons to operate within it below the surface of the water so as be protected from an enemy's projectiles by the water. It also consists in the combination with such chamber of an air-lock, so arranged below the surface of the water as to permit persons to pass through it on their way to and from the working chamber. Benjamin Maillefert and Levi Hayden, of No. 108 Wall street, New York city, are the inventors of this improvement.

Eccentric Valve for Steam Engines.—This invention consists in a certain novel construction of an eccentric and its encircling strap, whereby it is made so to operate the valve as to give a full opening to the ports, both for induction and eduction, during the first quarter of the stroke of the piston, and to close the ports during the last quarter of the stroke, leaving the valve stationary and the ports full open during the second and third quarters of the stroke, by which is maintained not only the full pressure of steam on the piston more nearly to the termination of its stroke, but to provide for a freer exhaust than is possible when the valve is connected with a common eccentric, thereby obtaining the full power of the engine and enabling it to work at a higher speed and keep up a more steady motion. Wm. G. Snook, of Corning, N. Y,, is the inventor of this improvement.

Method of Removing Torpedoes and Obstructions from Harbors and Rivers.—This invention consists in the removal or destruction of torpedoes or other submerged or partly submerged obstacles, or obstructions from harbors, rivers and other waters, by throwing over them from a mortar or mortars on board of a vessel placed at a suitable distance, projectiles which are furnished or have attached to them, hooks or other grappling devices, and connected with the vessel by ropes or chains of suitable length and then propelling the vessel in a direction to produce a draft on the said ropes or chains and drag away or destroy the said obstructions or obstacles. By this means the vessel employed in removing the obstructions is not liable to be damaged by the explosion of torpedoes. Charles Shoil, of Brooklyn, N. Y.; is the inventor of this improvement, and it has been assigned to F. A. de Mey, of No. 49 Broad street, New York.

Manufacture of Glass.—This invention consists in the employment for what is termed the finishing of glassware, of a furnace and pots of the same kind as are used in the melting process, whereby goods are produced having a brighter and cleaner surface than goods finished by the use of any other kind of furnace, as the glass while being finished is not exposed to the fumes of sulphur or to smoke, dust or any other deleterious agency. It also consists in providing in the outer shell of a glass furnace a system of air flues which are open at the top and the bottom on the exterior of the shell or cone, the lower opening being arranged at a suitable distance from the floor of the glass-house for the reception of the heated and impure air, and the upper ones for the discharge of such air above the roof of the house, and the said flues serving both for the ventilation and cooling of the house and for the reduction of the excessive heat of the shell of the furnace. John L. Gilliland, of Brooklyn, N. Y., is the inventor of this improvement.

Revolving Fire-arm.—In revolving cylinder fire-arms which load at the rear of the cylinder there have been many different constructions of the frame and modes of applying the cylinder to provide for loading. One mode of applying the cylinder, which admits of a very simple construction of the arm, is to attach its axis pin to a swinging support, which permits the cylinder to swing outward from the other parts of the arm in a lateral direction; but as the said pin has only been attached at one end to such support, the attachment has not been sufficiently firm and durable. The object of the first part of this invention is to afford a better support for a so-applied cylinder and its more durable attachment; and to this end it consists in the employment, within the main frame of the arm, of a laterally-swinging frame, constructed to support both ends of the axis pin and to fit within recesses in the main frame. The second part of the invention consists in a novel mode of applying a plunger in combination with a cylinder having such a swinging movement for the purpose of expelling the discharged cartridge shells from the chambers and cleaning them, whereby, while remaining attached to the arm, the said plunger is permitted to have the necessary movements for the purpose, and when not in use is permitted to lie close under the stationary barrel, out of the way. H. A. Briggs and S. S. Hopkins, of Norwich, Conn., are the inventors of these improvements, and C. A. Converse, of Norwich, Conn., may be addressed in relation thereto.

Postage Revenue Stamps.—The stamps at present in use for postage and inland revenue can, after being canceled, be easily restored beyond detection except by the most careful examination, owing to their being printed solely with indelible ink, and to the inks commonly used for their cancelation, viz., printer's ink for postage stamps, and writing ink for revenue stamps, being of a fugitive character. The object of this invention is to prevent the restoration of such stamps and thereby to protect the government against loss by their fraudulent second use, and to this end it consists in printing such stamps partly or wholly with fugitive ink, the impression of which will be destroyed or removed by the means that would be likely to be employed for the removal of the fugitive ink employed in their cancelation. Abraham J. Gibson, of Worcester, Mass., is the inventor of this improvement.

Dyeing and Printing Textile Materials.—This invention relates to a mode of applying that class of colors derived from aniline, naphthaline, nitro-benzine, cinchonine and analogous substances to the obtaining of patterns or designs upon textile materials and fabrics, and it consists in the employment of tannin, either alone or in combination, for the purpose of fixing colors derived from aniline or analogous substances on to textile materials and fabrics, in such a manner that cheap and fast goods can be produced. Robert H. Gratrix, of No. 69 East Twenty-seventh st, New York, is the inventor of this improvement.

It is stated that forty thousand dollars worth of Massachusetts marble has been used in the capitol at Washington.

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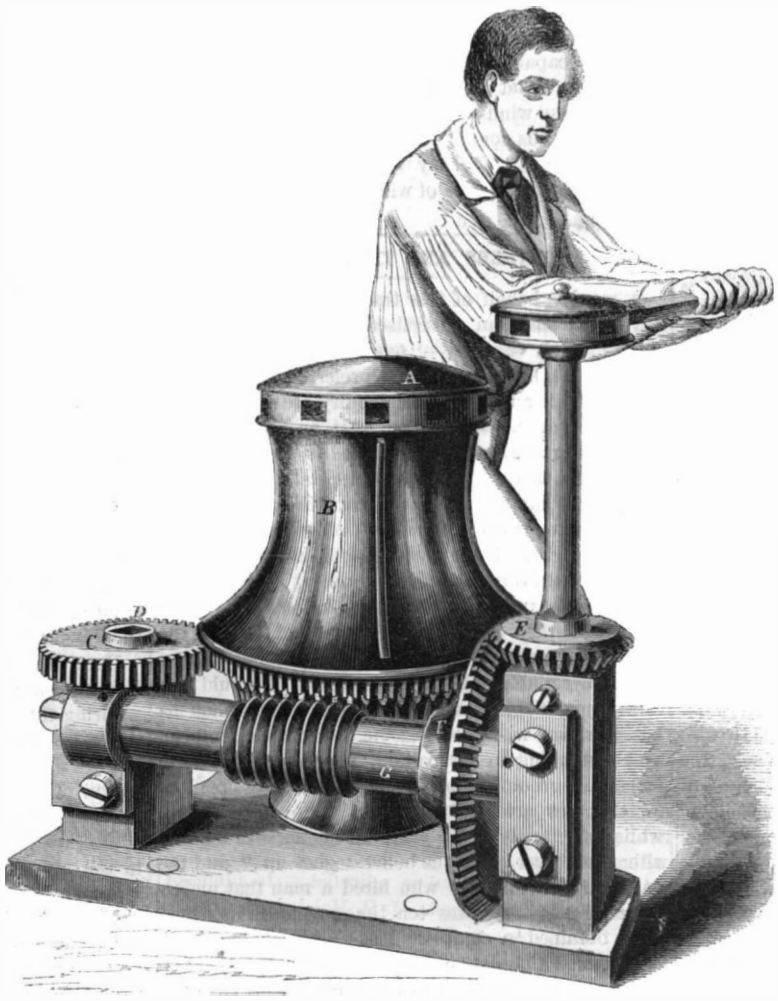
Improved Geared Capstan.

This improved capstan is a very powerfully-geared machine. In ordinary capstans the force of the operator is transmitted to the cylinder or drum, through the medium of a lever; the length of it and the diameter of the capstan body is a measure of the force exerted. In this capstan the lever or handspike is also used, but there are three distinct ways of applying the power. In the first, the capstan can be used as any ordinary one by simply placing the handspikes in the holes in the head, A; the drum, B, will then revolve as in all others. This is the quickest way of using the machine, and for fleeting up chain cables, falls or hawsers, it will be found valuable in connection with the other features of the capstan.

On the left of the engraving a horizontal spur wheel, C, may be seen, which gears into a similar fixture on the base of the capstan; this affords a slower motion than the first, and an increased strain on the line or chain which is wound on the drum; the gear is worked by the vertical shaft seen at the right; the end of it fitting in the socket, D, to which the shaft is transferred as required. The gearing through which the operator is exerting his strength, is yet another modification, and the most efficient one of all for extremely heavy work, such as dislodging anchors caught in heavy holding ground, hauling ships off shore, &c. &c. It will be seen that the vertical shaft is provided with a small capstan head, which has apertures for four or more bars, and that this shaft sets in a socket in the bevel wheel, E; this wheel gears into a large bevel wheel, F, on the shaft, G; this latter shaft has a worm upon it which meshes into a thread cut on the base of the drum.

Any one at all familiar with machines will see that this is a most effective arrangement for obtaining an immense strain. The movement of the drum is slow, but not necessarily so; for where steam power is convenient the capstan head may be removed and a pulley substituted which can be driven by a small engine; or for that matter this head is itself a pulley on which a belt may be run with perfect facility. Through this agent the velocity of the small shaft and worm can be regulated to suit circumstances. This machine combines a very wide range of usefulness, and will be found a most valuable aid on ship-board or for wrecking purposes. It is strongly fastened to a solid bed-plate, and can be made as heavy as required; suitable pawls are provided within the base of the drum to take up the slack or recoil of the same.

This is a most excellent capstan, and as such we do not hesitate to give it our endorsement. It was patented Oct. 20, 1863, by J. G. Morgan, of Ithaca, N. Y. For further information address G. H. Collins, 235 Broadway, New York.



MORGAN'S GEARED CAPSTAN.

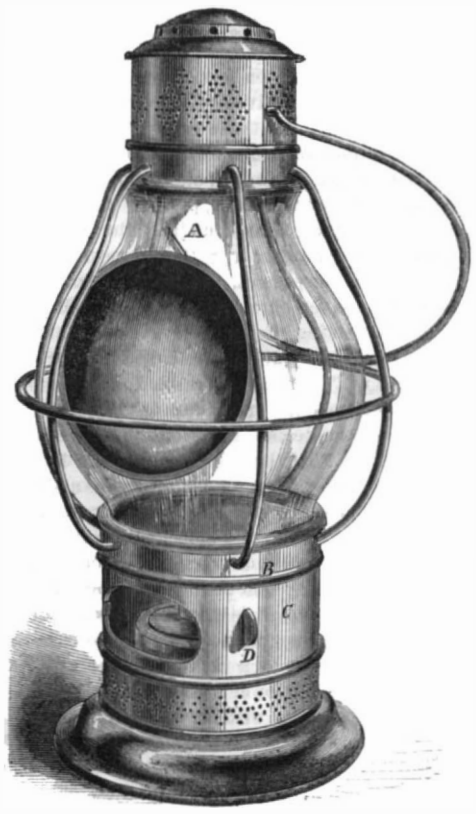
Porpoise and Shark Oil for Machinery.

The rebels are put to such straits for want of oil to lubricate their machinery with, that they have established a porpoise fishery at a place called "Weatherly Swash," the North Carolina coast where they take quantities of the fish; one porpoise yielding about ten gallons of oil. They also catch sharks and try out their livers for the sake of the oil they contain.

Porpoise oil is used chiefly for clocks and small tools; but is not adapted for heavy machinery, being too thin and without sufficient body. Peanut oil is also used; but the journal from which we take the above facts, adds, naively, "it is of little worth."

ATTERBURY & REDDICK'S REFLECTOR LANTERN.

This invention consists in applying a silver-plated or polished tinned reflector to one side of a lantern, so that it remains permanently fixed where it adds very much to the power or intensity of the light. When the glass shade, A, is first made, a circular opening, nearly the size of the reflector, is left in it; this opening is afterward closed by the reflector, which is permanently secured by means of cement or similar substance. This lantern is also conveniently arranged for lighting and filling. An aperture is left on the bottom, B, which is surrounded by a loose band, C; this band has also a hole in it, so that when it is



turned to correspond with the opening in the side, the lamp can be trimmed or filled as occasion may require. The small projection, D, is for convenience of moving the loose band spoken of previously. This invention was patented, May 12, 1863, by J. S. and J. B. Atterbury, Pittsburgh, Pa. For further information address Atterbury, Reddick & Co., at that place.

MACHINES FOR MAKING SKATES.

The pastime of skating has been so universally adopted that the demand for skates will increase instead of diminish for a longtime to come. There are so many varieties of the article in question, that it would be out of place to name any particular shape or pattern, as most desirable to be made by a special machine. Nevertheless it is easy to see that an apparatus for shaping the runners, in connection with another for grinding and polishing the same, would be the means of cheapening the article in a remarkable degree. A good pair of imported skates costs $5, which is far too much; domestic ones cost much less. Fine cast steel, far better than skate runners are generally made from, costs at this time 23 cents per pound; the metal in a pair of skates need not weigh over 1½ pounds at the most, which makes the cost of the raw material amount to 35 cents. There is no reason why a vast skate manufactory should not be established on the principle of a sewing-machine factory, to systematize the work, so that the cost of production shall be reduced to the lowest point, and as a consequence enhance the profits. The factories already engaged in skate-making might successfully employ a good machine for the purpose indicated, and although we know nothing of their wants in this respect, we do not doubt that they would be glad of a practical tool for the object indicated. The foot-hold of the skate, whether wood or iron, might also be provided for by special machinery. Skate-making tools are now as necessary as those for rifled muskets.

MESSRS. MUNN & CO. TO THE READER.

Wise ship masters, if they wish their vessels to be conducted in the quickest and safest manner through deviating channels, employ the assistance of the best and most experienced pilots. The same observation holds good in respect to the piloting of inventions through the courses of the Patent Office. Many thousands of patents have already been piloted by us with success, and the public confidence in our establishment has, from year to year, steadily increased. This has ripened our judgment, widened our experience, and prepared us to serve the interests of large numbers of clients in the most prompt and superior manner.

We find in the last weekly official list of patents granted the names of FIFTY-ONE of our clients. This is about forty-nine times more cases than the majority of patent agents in this country are in the habit of obtaining in the same period. Our experience in obtaining patents is so extensive, and our facilities for preparing the drawings and papers so complete, that we are often enabled to execute the work quicker and better than it can be done elsewhere, while no one can possibly enjoy better advantages for pushing cases speedily through the Patent Office. This is the reason why so many persons, living at a distance, prefer to send all their patent business to Munn & Co.

RAILROAD ACCIDENTS.—We learn from the *Railroad Journal* that 935 serious accidents occurred on American railroads in 1863, by which 264 persons lost their lives, and 671 were wounded. The number of casualties is less than in the previous year. In 1862, there were 263 lives lost and 870 persons wounded. We are pleased to make this record, more especially as our railroads were pushed to their utmost capacity last year. Railroad traveling is far more safe than by the old-fashioned stages.

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NEW YORK, SATURDAY, JANUARY 23, 1864.

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WIND-MILLS.

A contributor to the Glasgow *Practical Mechanics' Journal* gives an account of the use of wind-mills in several parts of the Old World. He had examined several near Eupatoria, in the Crimea, where there are about 200 employed, chiefly in grinding grain. They are all vertical mills, secured in brick. He also examined one lately erected at Moulin, France. The tower is of brick, 22 feet high, 18 feet in diameter at the base, and 15 feet at the top. The four wings of the mill are of a rectangular shape, 15 feet long and 5 feet broad, and the surface exposed to the wind is increased or diminished by canvas sails. The main shaft upon which the arms are secured is of oak, 15 inches in diameter and square at the front. The two pairs of arms do not intersect the shaft in the same plane, the one pair being in advance of the other and united by bolting with side pieces, so that the strength of the shaft is preserved without mortising. The bearing of the shaft is of hard *lignum-vitæ*, and is lubricated with soft soap and black lead. The rear bearing of the shaft runs in an iron box. On the middle of this shaft is a broad wooden-faced wheel, 4 feet in diameter, upon which there is a friction strap, which constitutes a brake for arresting the speed of the mill. There are also teeth on the rim of this wheel gearing into another on the end of a vertical iron shaft, which is coupled at its lower extremity to the top of the millstone spindle. It drives a pair of millstones 3½ feet in diameter—each, a whole stone of white silicious burr, obtained from the French quarries at Rouen. These stones are not formed with channels and lands, like English and American mill-stones, but with the millers' pick. The neck of the stone spindle is guided in a bushing of hard wood, having its fiber endways. The wings of this mill are 35 feet in extreme diameter, and they make 29 revolutions per minute when loaded: the extremities of the sail move with a velocity of 3,200 feet per minute.

In France, Holland, several parts of Germany, and the southern counties of England, wind-mills are still employed for grinding grain. In the town of Great Yarmouth, county of Norfolk, there are a number of very large wind-mills. The wings of some of these mills are 100 feet in diameter, and with a moderate breeze each drives six pairs of 4½-feet stones, each rim grinding about 5 bushels of wheat per hour. The main shaft is usually made of oak 3 feet in diameter; its main bearing has thick strips of iron sunk in it, and it revolves in a brass journal box. It has a cast-iron face-wheel, 12 feet in diameter, upon it; its rim has a broad surface for the friction brake, and the teeth gear into a main pinion or wallower, 4 feet in diameter, secured on the vertical shaft which extends down into the tower. On the lower end of this shaft is a great span-wheel, 14 feet in diameter, which drives the spindles of the six pairs of millstones, these being set around in a circle. To turn these mills to the wind, the roof of the tower with the wings is movable, on a turn-table arrangement. In Holland, where there is no coal or waterfalls, wind-mills are common. It is true they are not regular in their motion, being dependent on the fickle breezes; but the power costs nothing, and so far as relates to the working expenses, these are very small.

There are many sections in this country where wind-mills could be employed with advantage. Wind-mills should be built very strong and of the best materials that can be obtained for endurance. They should be capable of withstanding the great and violent pressure that is sometimes occasioned by sudden gales. Many wind-mills have been erected in several sections of this country, and we have seen a number on Long Island; but they were mostly far too frail, and therefore incapable of withstanding sudden gusts of wind.

ENGINEERS AND THEIR DUTIES.

A word in behalf of this trade. We noticed only a day or two since an advertisement in a daily paper calling for an engineer—"one who had some knowledge of the baker's business preferred." This is in keeping with another public inquiry we once noticed in a newspaper, which stated that an engineer was wanted to run a small engine, and—what! why "to look after a horse!" Let any one take up a daily journal, no matter in what part of the country, and see how frequently the notices of steam boiler explosions occur. It seems as though this class of accidents were never more general than at present; and this, notwithstanding that steam boilers are better built than they were twenty years ago. Have the bakers and hostlers obtained their situations, and are they now running engines and boilers? It would certainly appear so. An engineer who understands his business, and wishes to become a proficient, to keep up his standing in his calling, has no spare time to employ in grooming horses, or seeing that bread or sweet cakes are not burned in the oven. Perhaps while the "engineer" is currying the horse or looking after the ginger bread the boiler "goes up," and the enterprising employer who hired a man that understood two callings loses ten times as much as would have obtained a competent engineer for life. If a man owned a powder mill and employed an individual to take a candle and go over it carefully every night, he could not be guilty of a much greater imprudence than the individual who hires a person to take care of a steam boiler and perform other duties besides. His legitimate calling requires all his time and oversight, and if fewer bakers and livery stable-keepers were employed to run steam engines we should not hear of disasters so often.

TILLAGE BY STEAM.

An Association has been formed in England, called the "General Steam Cultivator Company" the objects of which are similar to those of a Loan Company. It proposes to furnish farmers with steam machinery, the price of which is to be paid to the Company in annual rates, extending over periods varying from three to seven years, one-fourth of the machinery being paid by the purchaser within three months of the date of the agreement. This steam machinery includes engines for thrashing, &c., as well as for plowing. A meeting of proprietors of land and farmers took place lately at what is called the "Smithfield Club Show," at which a resolution was unanimously adopted endorsing the advantages that had been derived from steam cultivation. The resolution is as follows:—"That the cultivation of the land by steam is now proved to be an advantageous and highly economical process; and the machinery used for this purpose is of a character sufficiently perfect to be recommended for the use of practical farmers." Fowler's steam-plowing system seems to be the only one that has won success. A steam engine stationed at one side of the field operates a drum or windlass, and the plows are drawn by a tackle of steel wire rope across the field. The power of the engine is thus applied to draw the plows without expending unnecessary labor in moving itself. From experiments made to determine the amount of engine power thus directly applied to turning the furrow with these plows, it was found to be 86 per cent; which shows that only about 14 per cent. was consumed in the friction of the tackle and gearing. Several of these steam plows have lately been introduced in the islands of Barbadoes and Demarara, on sugar plantations; and owing to the greater depth of tillage obtained by them, the sugar crop has been wonderfully increased. We believe that the steam plow would effect a beneficial revolution in the cultivation of the cotton, rice and sugar plantations of the southern states, for which there will certainly be a deficiency of manual labor and mule-power after the war is over. Hitherto the soil of these lands has been merely scratched on the surface, but with the steam plow, furrows twelve inches in depth may be turned over and rich deep undersoil raised to the surface. Of course steam plows can only be employed by persons who have a large capital; but companies may be formed for the purpose of cultivating extensive plantations by steam-power.

ACCIDENTS FROM CARELESSNESS AROUND MACHINERY.

With the introduction of machinery, careless people seem to have enjoyed special facilities for maiming and destroying themselves. Scarcely a day passes that we do not read of lives lost, arms, hands, and legs cut off, through the inattention or carelessness of the sufferer. Here is one instance which we cut from an exchange, where the victim lost his life through his own recklessness.

Jacob Vogle, acting engineer at St. Charles Furnace, was standing on an arm of the fly-wheel, adjusting the pump which had got out of order, when the engine started, crushing him between the connecting rod and arm of the fly-wheel, killing him almost instantly. The Superintendent had just warned him of the danger he was in, in getting upon the wheel.

Here is still another case where a man was killed, from the carelessness of the engineer in not properly securing the air-pump cover on board of a steamer, which was raised to afford access to the interior.

"As the steamer *Europa* was proceeding to Sorel in tow of the *Napoleon*, a fireman named Toussaint Letendre, employed on board, was accidentally killed. It appears that deceased, aided by another man, was in the air-pump adjusting some portion of the machinery. The fastening gave way, and the deceased made an attempt to get out. While so doing the top came down with terrible force upon the middle of his body, literally severing it in two—one part falling outside and the other within the air-pump. Letendre's companion crouched down inside, and managed to escape unhurt."

A shocking death, certainly. Gears are a fruitful source of injury to mankind, and while a man may stand on one side of a set without danger, it is extremely hazardous to venture near "the running side" of heavy wheels.

It appears that an individual who was tending a mill in Pennsylvania lately, fixing something between the two mill stones, had his pantaloons caught in the cog wheel. He was drawn in and both legs and one side of the lower portion of his body mashed. The terrible and irresistible power which drew him to death may be inferred from the fact, that his crushed and mangled limbs raised one of the stones, weighing 1,700 pounds, several inches. The crushed bones clogged on the cog wheels, and stopped the mill. He died shortly after the accident.

So also with thrashing and mowing machines. These are as harmless as cooking-stoves, when proper care is taken by those who attend them. It seems, however, that a young man by the name of William Regan, while attending a threshing machine in the township of Mono, C.W., got his arm fearfully lacerated by being caught in the cylinder of the machine, and his thigh broken by becoming entangled with the shaft. And also in the township of McKillop, C.W., a woman, whilst passing a threshing machine, with a child in her arms, had her dress caught in the tumbling shaft of the machine, and was drawn round the shaft twice before the machine could be stopped. At the moment escape from instant death seemed impossible, but on extricating her, it was found that no fatal injury had been sustained. The escape was truly providential.

Few escape so fortunately, and the examples given above should serve as warning to those who have charge of machines of all kinds, that they cannot be too careful in its presence.

TRAINS are now running on a broad-gage railroad without a change of cars, from New York to Cleveland, Ohio.

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ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING JANUARY 5, 1863.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

41,047.—Automatic Railroad Pump.—J. B. Atwater, Chicago, Ill.:

I claim, first, The yielding track, A, employed in combination with a pump, G H, substantially as described for raising water by the weight of a locomotive or car.

Second, The combination of the levers, E E', F F', weights, P P, and cord, K, with the yielding track, A, and pump, G H, for the purpose specified.

[By means of this contrivance the weight of passing locomotives or trains is made to elevate an ample supply of water for filling th tenders.

41,048.—Lamp Burner.—James R. Baker, Kendalville, Ind:

I claim having the upper part of the slide, C, made in the form of an annular plate, D, with arms, b, and carrying a spring, F, the whole constructed and operating in the manner herein shown and described.

[This invention relates to an improvement in that class of lamp burners which are constructed with a view to the adjustment of the cone and draft chimney to admit of the wick being trimmed and lighted without detaching the chimney from the burner, and also with view of admitting the lamp to be filled or replenished with oil without detaching the burner therefrom.]

1,049.—Case for Conveying Fruit Boxes.—R. H. Baker, Jamestown, N. Y.:

I claim a fruit case constructed of a series of boxes, so arranged as to admit of being taken apart and adjusted together, and a series of frames to receive the boxes, all arranged as substantially set forth.

[The object of this invention is to obtain a case for conveying or transporting fruit, such as strawberries, blackberries, &c., which may be readily adjusted or arranged to securely hold a number of boxes of a suitable capacity, and when not required for use or when the boxes are emptied of their contents, be capable of being adjusted in a very compact form, so as to facilitate the transportation of the case back to its destination.]

41,050.—Thread-waxing Device for Sewing Machines.—Isaac Banister, Newark, N. J.:

I claim the combination of the two plates, D E, the arched piece, I i, and the set screw, J, the whole constructed and operating substantially as and for the purpose herein described.

[This invention relates to an apparatus for waxing the thread with liquid wax. The improvement consists, firstly, in the employment for removing the superfluous wax from the thread after it has passed through the wax trough, of a tube or eye of india-rubber or other elastic or flexible material, which can be more or less contracted or expanded to suit thread of different sizes, and according to the quantity of wax desired to be retained in or on the thread. It also consists in a certain construction of the stock which holds the aforesaid tube, whereby provision is made for the contraction and expansion of the said tube.]

41,051.—Heater.—Louis F. Betts, Albion, Mich.:

I claim the use of an open flue, F, in combination with the open, detachable, conical air-tube, J, connected, arranged, and operated substantially in the manner and for the purposes herein specified.

41,052.—Bee-hive.—T. F. Bingham, Gowanda, N. Y.:

I claim, first, The comb frames, G, constructed with top bars, h, having beveled or inclined upper surfaces, and with or without beveled under surfaces, and having pendants attached centrally to them formed of two vertical parallel bars, k k, substantially as and for the purposes herein set forth.

Second, The blocks, m, fitted between the bars, k k, of the pendants of the comb frames, as and for the purpose herein specified.

Third, the transferring bars, n, in combination with the comb frames, G, for the purpose set forth.

Fourth, The removable ventilating frames, B C C, provided with wire gauze and strips or stoppers, substantially as and for the purpose specified.

Fifth, The combination of the sectional floor, H, comb frames, G, spare honey boxes, D, and removable ventilating frames, B C C, all arranged substantially as and for the purpose set forth.

41,053.—Preserving Eggs.—A. M. Blinval, New York cit :

I claim preserving eggs by inclosing them, separately, in an impervious covering or envelope, substantially as set forth.

I also claim arranging several eggs, each being independently enveloped, as set forth, in a continuous covering, substantially as described.

41,054.—Skids for Drays.—E. H. Boswell, Philadelphia, Pa.:

I claim the securing of the rungs or skids, E E, to the dray bed, A, by means of the fastening formed of the slots, a, in the bars, D D, the plates, I, provided with the slots, c, and partially covering the slots, a, and the T-shaped projections, d, attached to the rungs or skids, substantially as and for the purposes herein set forth.

[This invention relates to a mode of connecting the skids to the dray, whereby the former are made to perform three separate and distinct offices, to wit: that of skids proper, to aid in loading and unloading the dray, of extension bars to give additional length to the bed of the dray, and of rungs to hold the load on the dray—the skids being used in the latter capacity when an extension of the dray bed is not required.]

41,055.—Stump Machine.—A. E. Boynton, Hartford, Wis., and G. R. Boynton, Chicago, Ill. Ante-dated Nov. 16, 1863:

We claim, first, The use of two or more fulcrums or their equivalents, when used for the purpose and substantially the same as herein specified.

Second, We claim the method of operating the lever, L, by a rope or cable, in any manner substantially the same, when used for the purposes herein specified.

Third, We claim the manner of loading said machine for transportation, on two or more wheels, by attaching the chains, x, to any part of said machine, so that it may be lifted in any manner equivalent to our specification.

41,056.—Plow Beam and Handle.—M. C. Brelsford, Girard, Ill.:

I claim a plow stock having the beam, A, and the handles, B, made out of one piece of wood in the manner and for the purpose substantially as set forth.

[This invention consists in a plow stock, the beam and handles of which are made of one piece of wood in such a manner that the whole plow can be made without requiring a single mortise, and a simple, cheap and durable plow stock can be produced.]

41,057.—Sash Fastening.—R. W. Clough, Williamsburg, N. Y.:

I claim the construction and arrangement of the pawl, D, in the manner herein shown and described, when operating with the pinion, B, and rack, A, as set forth, so that said pawl, D, will be confined within the box, C, and will fall and lock the pinion by gravity.

[This invention consists in attaching to the sash at one side a rack into which a pinion goes; the pinion being fitted in a box which is placed in the casing of the window or a head thereof, and a panel being also placed in the pinion box in such relation with the pinion that the latter may be prevented from turning at any time, and the sash retained by it at any desired hight.]

41,058.—Potato Digger.—S. B. Conover, New York city:

I claim, first, The rotary conveyer formed of the shaft, E, and spiral blades, h, one or more, in combination with the semi-cylindrical vibrating screen, F, the above parts being placed within an adjustable frame, A, and all arranged to operate as and for the purpose specified.

Second, the spring or elastic bar, O, with bar N attached, and the latter connected by cords or chains, b, to the hinged bottoms, a' a'' as and for the purpose set forth.

[This invention consists in the employment or use of a rotary spiral elevator or conveyer, in connection with a vibrating screen and a scoop or plow, all so arranged and applied to a mounted frame that the potatoes, as the machine is drawn along, will be plowed up from or out of the hills or drills, separated from the earth, weeds and trash plowed up with them and deposited in suitable receptacles prepared to receive them. The invention also consists in a novel means employed for discharging the potatoes from the boxes or receptacles into which they are deposited after being dug up and screened.]

41,059.—Sizing and Smoothing Shot and Shell.—James Cumming, Boston, Mass.:

I claim, first, The employment of a horizontally-rotating turn-table, provided with two pairs of conical rollers arranged on axes parallel with each other, forming a seat for the spherical body to be sized and smoothed, in combination with an adjustable grinding or polishing wheel, substantially as and for the purpose described.

Second, Moving simultaneously the two pairs of conical rollers to or from each other, substantially set forth and for the purpose described.

Third, Making the conical rollers adjustable in the line of their axes, substantially as and for the purpose described.

Fourth, The combination of the treadle-lever, q, pin, i, spring, P, and adjusting pin, M, substantially as set forth and for the purpose described.

41,060.—Socket for Paint and other Brushes.—J. W. Davis, Washington, D. C.:

I claim the combination of the socket, b, and flange, a, with brushes for painting, frescoing and whitewashing, substantially as specified.

41,061. Heat Radiator. A C. Edwards, Southampton, Mass.:

I claim, first, The employment or use, in a drum or pipe of a series of heat-radiating tubes, B, a certain number of which are movable or allowed to rotate and provided with flanges, a, to serve as dampers, substantially as herein set forth.

Second, The tubes, B, movable or fixed, in combination with the spiral flange, C, said parts being arranged within the tube, A, to operate substantially as set forth.

[This invention consists in having a series of tubes placed transversely in a pipe connected with or leading from a stove, furnace, or any heating apparatus; the ends of said tubes communicating with the external air, a portion of them being allowed to turn and provided with flanges to serve as a damper, and using in connection with the tubes aforesaid a spiral flange whereby the heat within the pipe is radiated from it, by a very compact and simple means.]

41,062.—Head Dresses for Ladies.—John Edwards, of New York city:

I claim reversing one-half of the hairs used in the manufacture of head dresses which are made of horses' hair dyed in imitation to human hair, and bringing the roots of one portion opposite the points of the other portion, substantially as and for the purpose set forth.

This invention consists in the application of braids made of horse hair, dyed in imitation of human hair, as a substitute for the buman hair generally used in the manufacture of head dresses; also in reversing one-half of the hair and bringing the points of one portion opposite the roots of the other portion, in such a manner that the dark shades in the color of one hair are compensated by the light shades of an adjoining hair, and a braid of an apparently uniform color throughout is produced.]

41,063.—Cross-cut Sawing Machine.—A. B. J. Flowers, Indianapolis, Ind.:

I claim, first, The giving of the saw, Q, a vibrating motion independently of its reciprocating movement, through the medium of the bar, L, yoke, K, and eccentric, J, arranged substantially as and for the purpose herein set forth.

Second, The clamp lever, W, formed of the bar, a, provided with the mortise, b, and clamp or jaw, c, substantially as and for the purpose specified.

Third, The dog, composed of the bar, V, and spike, d, arranged and applied substantially as set forth.

[The object of this invention is to obtain a simple and efficient cross-cut sawing machine which will occupy but little space, be capable of being readily manipulated, the saw as it operates enabled to clear the kerf of sawdust, the log fed or adjusted to the saw with the greatest facility, and firmly retained in position when adjusted.]

41,064.—Blind and Shutter Fastening.—Jacob Frick, Philadelphia, Pa.:

I claim, first, the pieces D and E, constructed, joined together and operating substantially as described, for the purpose specified.

Second, The piece, D, with its hollow cylindrical projection, b, spiral spring, g, and rod, c, connected to the piece, E, and having a disk, d, the whole being arranged, for the depression of the piece, E, to the piece, D, substantially as set forth.

Third, The spring, F, secured to the piece, E, for operating on the shutter substantially as described.

41.065.—Manufacture of Glass.—J. L. Gilliland, Brooklyn, N. Y.:

I claim the employment, for the finishing of glass ware, of a furnace and pots, substantially as herein described.

41,066.—Dyeing and Printing with Aniline colors.—R. H. Gratrix, of Salford, England. Patented in England, Sept. 12, 1860 :

I claim the employment or use of a compound of tannin with the colors derived from analine or analogous substances formed either before or during the process of dyeing or printing, substantially in the manner herein specified, in combination with salts of tin or other mordant or mordants for the purposes set forth.

41,067.—Closing Bottles.—Edward Hamilton, of Chicago, Ill., assignor to himself and H. B. Goodyear, of New Haven, Conn.:

I claim the method of stopping bottles containing liquids charged with gases, by the employment, in connection with a bottle, of a ball or other stopping plug made of a light elastic substance impervious to water and gas, so that the gases within the bottle may, without the aid of springs or other mechanical contrivances, force the ball or plug up the neck of the bottle and maintain it in position hermetically to close the bottle, substantially as herein shown and described.

Second, As a new article of manufacture I claim the herein-described self-stopping bottle, the same consisting of a bottle containing a ball or plug of requisite shape, made of an elastic and light substance, but impervious to liquid or gaseous fluids.

Third, I claim the combination of a bottle with an elastic ball, of such diameter in relation to that of the neck of the bottle as that the force required to introduce the ball into the bottle from without shall exceed that exerted by the gases from within.

41,068.—Lubricating Composition.—William Hilton, Belvidere, N. J.:

I claim the admixture of the foregoing ingredients in the proportions named, and thereby manufacture a new lubricating oil for oiling machinery.

41,069.—Eyes for Lacing Bootees and Other Articles.—Louis Hoffmeister, Philadelphia, Pa.:

I claim the within-described eye for laces, consisting of a strip of metal formed, bent and constructed for attachment to articles of wearing apparel, substantially as and for the purpose described.

41,070.—Straw Cutter.—F. B. Hunt, Richmond, Ind.:

I claim, first, The combination with cutting bar or plate, E, of the single knife, D, and arms, c c, attached to a driving shaft, C, located in front of and above the plate, E, so as to effect an oblique or drawing cut as explained.

Second, Attaching the fly wheel, E', to its shaft, C, in the manner shown, or in an equivalent way, to admit of said wheel slipping on its shaft, in case the motion of the cutter or knife is arrested by any foreign substance, for the purpose of preserving the cutter or knife as set forth.

Third, The bar, c', connected directly to the shaft, n, of the lower feed roller, G, and connected to the shaft, p, of the upper feed roller, H, by the arm, f', and having the pinions, b' d', attached to it; said bar and its pinions being arranged in gear with the pinions, a' e', of the feed roller shafts, n p, substantially as and for the purpose set forth.

Fourth, The guide board or guide plate, u, attached to the plate, t, of the frame of the upper feed roller, H, and extending down at the back of said roller to a level with the shaft, p, of the same, substantially as and for the purpose specified.

41,071.—Harvester.—T. S. Hunter, of Cross Plains, Ind.:

I claim, in combination with the convex half-circular smooth-edged cutters, O, the concave or scolloped guard fingers, D, having smooth concave edges, 2, against which the convex cutters work, the upper part, 3, of the guard being closed while the lower part, 4, extends under and to the rear of the cutter, leaving an opening through which grass and other material is discharged to clear the cutters. [An illustration and description of this invention will soon appear in the SCIENTIFIC AMERICAN.]

41,072.—Horse Hay Fork.—T. H and H. James, Stock port, N. Y.

We claim the lifting bar, G, provided with a spiral tine, H, at each end, combined with the head, A, in the manner herein shown and described.

We further claim the steady tines or rods, F, attached to the head, A, when used in combination with the spiral or screw tines, H, for the purpose specified.

41,073.—Felted Fabric.—M. A. Johnson, Lowell, Mass.:

I claim, as a new article of manufacture, the sheet-felted fabric herein described, having one or both surfaces coated with a film of sizing as set forth, but the body of the fabric not saturated or impregnated with the sizing material.

[This invention consists in a felted fabric composed of cattle hair having mixed with it a small proportion of silk waste cotton or other fibrous material, coated on one or both surfaces but not saturated with a thin film of glue, size, gum, or other sizing or glazing material, the advantage of which over other felted goods consists in its combining in a higher degree the qualities of lightness, strength and elasticity. This fabric is suitable for many purposes, among which may be mentioned ship felt, packing for medicines, glass ware, &c., tailors' padding or wadding and carpet felts.

41,074.—Automatic Railroad Switch.—J. A. Lanzirotti, Paris, France.

I claim combining with locomotives, tenders or carriages in front of the train, a series of adjustable rods to operate at the sides of the rails, levers or other appliances arranged in diverging lines of rails at different elevations, or more or less projecting laterally, so that by the adjustment of the said rods the switches at the points of contemplated change of rail may be worked automatically, substantially as herein shown and described.

41,075.—Filters.—J. G. Lefler, Philadelphia, Pa.:

I claim, first, The perforated plates, G and I, connected together by rods, H, or their equivalents, and arranged for retaining a mass of filtering material within a casing, A, and for the withdrawal of the said filtering material from the casing, substantially as and for the purpose herein set forth.

Second, In combination with the above, I claim the cap, D, adapted to the casing, and rendered detachable from the same, as set forth.

41,076.—Hair Restorative.—James Lucks, of Indianapolis, Ind.:

I claim the compound herein described when composed of the substances as specified with the variations contemplated and used, for the purposes set forth.

41,077.—Cock.—J. L. Lowry, of Pittsburg, Pa.:

I claim the double stuffing box T, with the partition, J, in combination with the valve stem, B, and collar, m, the gum rings above and below the position arranged substantially as herein shown and set forth.

41,078.—Diving Room.—Benjamin Maillefert and Levi Hayden, New York city:

We claim, first, Providing a vessel with a fixed working chamber, A, substantially as and for the purpose herein specified.

Second, The air-lock, B, arranged in relation to the working chamber, A, substantially as and for the purpose herein specified.

41,079.—Window for Railroad Cars.—George Mann, Jr., Ottawa, Ill.:

I claim the supplemental window attached to the side of the car at the exterior of the ordinary or usual window, in the manner substantially as herein described, to admit of the adjustment of the supplemental window in an oblique position relatively with the side of the car, as and for the purpose specified.

41,080.—Raking Device for Harvester.—C. W. Marsh and W. W. Marsh, Shabbona, Ill.:

We claim providing the sickle, C, with ribs or projections, b, when the latter are used in combination with the endless band, B, and toothed apron, D, for the purpose specified.

We further claim the toothed belt, F, in combination with the toothed apron, D, and endless band, B, as and for the purpose set forth.

[This invention relates to an improved raking device, of that class in which a platform composed of an endless band is employed in connection with an endless toothed elevating apron, and the invention consists in giving the endless band a quicker movement than the toothed elevating apron, and using, in connection with the parts aforesaid, a series of upright ribs or projections at the back part of the sickle, all being arranged in such a manner that the cut grain will be elevated and deposited in the trough or receptacle prepared to receive it, in an even and proper manner, all the buts of the stalks being parallel with each other.]

41,081.—Mop Head.—H. H. Mason and S. W. Sheldon, Springfield, Vt.:

We claim as an improved article of manufacture, a mop head constructed in the particular manner herein shown and described, to wit: the bars, E B, of cast-iron, with attached teats, connected by springs, F, and the rod, D, of wrought-iron, in one piece, all as set forth.

[This invention relates to a new and improved mop head, of that class in which springs are employed and applied to the movable or sliding jaw, to cause the cloth or mop to be secured between the sliding and the stationary jaw.]

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41,082.—Bottling Liquids Under Pressure.—John Matthews, jr., of New York city :

I claim, first, The combination, with the feeding head, of a plunger, operated in the manner and for the purpose substantially as set forth.

Second, I claim attaching the screen to the mouth of the feeding-head, whether the head is fixed or movable, in the manner and for the purpose substantially as described.

Third, I claim surrounding the bottle with a perforated drain-plate ying flush with the surface of the table, substantially as set forth.

41,083.—Method of Operating Out-off Valves.—Green B. McDonald, of Louisville, Ky. Antedated Jan. 2, 1864 :

I claim first, the piston H, fitted with a valve or valves, b b, and the cylinder, I, furnished with a side passage, c, and valve or cock, d, and containing oil or other liquid, applied in combination with each other and with the induction or cut-off valve, A, to operate substantially as and for the purpose herein specified.

Second, The passages, f f, in the said cylinder, I, arranged and operating in combination with the said piston, H, substantially as and for the purposes herein described.

[This invention relates to what are known as the drop cut-offs, in which the closing of the induction valve or other valve employed for cutting off the st am is effected by the weight of the valve itself or by a weight or spring connected therewith, after such valve has been lib erated from its opening mechanism. It consists in certain novel means of regulating the closing of the said valve, after its liberation either by means of a manual adjustment or under the control of a governor.]

41,084.—Hot Air Engine, Henry Messer, of Roxbury, Mass.:

I claim the construction of the walls or crown of the furnace, or both in the manner and for the purpose substantially as described.

Also checking the motion of a hot-air engine piston, by connecting the air-pump with the cylinder in such a manner that the whole or a portion of the air condensed by the pump can pass into the cylinder without detention on its passage, for the purpose of being heated, and by arranging in such a connection or passage, a valve so connected with the engine regulator that, by the action thereof, air may be admitted through said connection direct from the air pump into the cylinder, for the purpose of checking the speed of its piston when moving too rapidly.

Also the arrangement of the valve, i, with respect to the pump, the space below the grate and the space in the walls of the surface, substantially as and for the purpose specified.

Also the arrangement in one passage of a valve operating to check the speed of the engine piston, substantially as described, with a valve operating to determine in what proportion air shall be supplied to the furnace above or below the fuel.

Also a piston for hot-air engines, constructed with packing therein at its upper end, this being open for entrance and vibration of the connecting rod, and with an extension, *o*, downward therefrom, substantially as described, when this extension enters into and is surrounded by the casing, p, so as to leave space between o and p for non-conducting filling,

Also the arrangement and combination of parts substantially as shown and described, by which conduction of heat from the lower to the upper part of the cylinder is materially lessened.

Also constructing the cap of a wrist or journal box with tubular screws capable of adjustment, and surrounding the screws or studs which hold the cap to the lower part of the box, substantially as and for the purpose specified.

And so constructing the lower part, b, of the cylinder and the valve seats, chambers and induction and eduction passages, that they all form one and the same casting, with the mouths or outlets of the valve chambers in the same plane with the flanged open end of said part *b* of the cylinder, substantially as and for the reasons specified.

41,085.—Obtaining Useful Products from the Tarry Residuum of Petroleum.—Adolph Millochau, of New York city :

First, I claim producing an oil or grease from petroleum or coal oil tarry residuum by the process herein set forth, said process consisting in treating said residuum, firstly, with benzine or "light oil," and then with an acid, and in removing the acid by means of an alkali and water, the whole substantially as described.

Second, I also claim producing from said residuum an oil suitable for burning in lamps, by the within-described combination of processes; that is to say, by first preparing the oil or grease in the manner herein set forth, and then distilling the same, substantially as specified,

41,086.—Cultivators.—James R. Mills, of Bloomfield, Iowa.

I claim first, In combination with the pivoted frame, K K M R, and drag beams H H', constructed and arranged as specified, the post, N, and lever, P, constructed and applied in the manner described, to adapt the cultivator frames to be moved laterally or either or both of them raised by means of a single lever as explained.

Second, I claim the movable bar, O, when employed in combination with the post, N, reversible lever, P, and reversible beams, H H', in the manner described, for the purpose of adapting the machine for furrowing the ground, so as to prevent the settling of water around the roots of the plants in wet weather.

[This invention consists in an ingenious arrangement of parts, whereby a single lever may be made to constitute means for elevating the cultivator teeth simultaneously or those on one beam alone.]

41,087.—Boot Straps.—F. H. Moore, of Boston, Mass. :

I claim a strap for boots and shoes, constructed of metal or other suitable rigid or tough material, and appli d in such a manner as to be capable of being moved or adjusted by sliding in the boot or shoe, to effect the end herein set forth.

[This invention is designed as a substitute for the ordinary woven or webbing boot straps in common use. The object of the invention is to supersede the woven or webbing straps by obtaining one that will be more durable, cheaper or capable of peing applied at a less cost, and which will possess the advantage of being manipulated with greater facility than the ordinary straps in use.]

41,088.—Die-Sinking Press for obtaining Relief Plates for Surface Printing.—W. H. Oakes, of New York city :

I claim the screw-lever or pulley, F, or its equivalent for the purpose of depressing the pouch, tool or die in combination with the adjustable stop, H, and set screw, I, whereby a uniform depth of impression is secured.

41,089.—Apparatus for Evaporating Liquids.—Alfred Peek, of Manchester, England :

I claim the arrangement of the revolving agitators, hollow shafts, main and branch steam pipes and overflow passages, substantially as herein described, so as to prevent the temperature applied exceeding the boiling point of water.

[This invention consists in certain improved apparatus for evaporati g saccharine and saline solutions, in which apparatus the heat necessary for evaporation cannot be raised beyond the boiling point of water, but it may be kept to any required degree below that temperature.]

41,090.—Condensing Milk.—Julius R. Pond, of New Hartford, Conn. :

I claim the employment of oleine or its equivalent in the process of condensing milk.

41,091.—Pump.—J. Wyatt Reid, of New York city :

I claim the combination of the quadruple induction valves, I I' I* I'*, and the quadruple eduction valves, E E E* E'*, with the abutments, B, oscillating pistons, D D', shaft, C, and cylinder, A, in the manner herein shown and described.

[This engine or pump is composed principally of a cylinder containing one or more radially arranged abutments, and fitted with a central oscillating shaft, carrying a piston or pistons which work between the said abutments and with a suitable system of valves. the opening and closing of which may be effected by the movements of the pistons without any connecting mechanism or by connections with mechanism, deriving motion from the shaft according to the purpose to which the engine is adapted.]

41,092.—Lamp Cone.—E. B. Requa, of Jersey City, N. J.:

I claim First, The slot, a b, extending straight across the apex of the cone and obliquely downward in opposite directions at the sides, all as represented and described.

Second, The wings, c c, constructed and operating as specified.

Third, The described combination of the peculiarly-shaped slot, a b, and wings, c c, for the purposes set forth.

[This invention consists in providing the cone or deflector with a slot or opening of peculiar form, whereby free access is allowed the air to the sides of the upper part of the wick and the latter allowed to burn uniformly or evenly, entirely across its whole upper end and with a broad flame.]

41,093.—Coal-Oil Lamp.—Joseph Ridge, of Richmond, Ind. :

I claim the hemispherical cone or deflector, A', with its longitudinal sectional slot, as constructed and described, in combination with the short chimney, D, in the manner and for the purposes set forth and described.

41,094.—Coal-Oil Lamp.—Joseph Ridge, of Richmond, Ind. :

I claim first, The hinged studs, H H, and the cup or bottom piece, J, for the purpose set forth.

Second, The rigid closing of the perforated cylinder, L, at the points of its circumference, F and F, or at any other points thereof, for the purpose of controlling the form and size of the flame as described.

Third, The aperture, F', in combination with the cup or bottom piece, J, and the orifice, G, as set forth.

Fourth, The combination of the hinged studs, H H, the cup, J, the apertures, F F', and the ears, E E, with the longitudinally-sectional slot of the cone, A.

Fifth, I claim my device as shown and described, constructed in the manner and for the purposes fully set forth.

41,095.—Culinary Vessel.—Ezra Ripley, of Troy, N. Y. :

I claim a culinary vessel having an opening, A, in its top to pour into, a spout-lip or pouring-out place, B, at one side, and on the opposite side a lifting handle, C, extended over the middle portion of the vessel, but not across from side to side thereof, substantially as herein described.

41,096.—Means of Attaching Clew-Line Blocks to Clews.—Eben A. Sawyer, of Portland, Maine :

I claim first, Attaching clew-line blocks to their clews by means of a metal fork formed on said clews or other rigid connection, substantially as and for the purposes described.

Second, Uniting blocks to their clews by means of a single bolt, which also forms the pivot-fastening of the sheave, substantially as described.

Third, The clew, a, having a block receiving fork, b b, formed on it, substantially as and for the purposes described.

41,097.—Putting Up Powders, &c.—Henry Sawyer, of Roxbury, Mass. :

I claim, as a new article of manufacture, a package or case which, when made with distributing holes and filled, is cemented by the wax or wafer, a, as set forth.

41,098.—Refrigerator.—John J. Schooley, of New York city :

I claim the conduit, F F, so arranged that the air passing through it will become cooled and will flow into the preserving chamber without coming into contact with the ice or entering the ice chamber, substantially as and for the purpose set forth.

41,099.—Refrigerator.—John C. Schooley, of New York city :

I claim the peculiar construction of the plate or receptacle, B, having an extended arm, d, so arranged that the air for ventilation will enter it at a point above where it flows out into the preserving chamber.

I also claim the combination of the open bottom ice chamber, A, The receptacle or plate, B, with its arm, d, and the provision chamber, C, all so arranged that the internal air will be made to rotate and circulate, and the external air will pass in currents through the provision chamber, the whole arranged and operating substantially in the manner and for the purposes set forth.

41,000.—Wrench.—Henry Sharp, of Port Richmond, N. Y. :

I claim the jaw, E, attached to the slide, D, in combination with the lever, G, and rack, C, all arranged substantially as shown to form a new and improved wrench.

41,101.—Preparing Vegetable Fiber for Paper Stock.—George Escol Sellers, of Sellers' Landing, Ill. :

I claim first, The preparation of disintegrated vegetable fiber for white paper stock, by the removal or change in the nature of the incrusting or adhering non-fibrous matter by fermentation and washings, previous to bleaching with chlorine, substantially as described.

Second, The use of chlorine as a solvent for the non-fibrous portions of vegetable substances that have become discolored and hardened by heat in the process of disintegration, combined with boiling and hot water washing to remove them from the fiber previously to bleaching, substantially as described.

41,102.—Forming, Drying and Packing Paper Stock, &c.—George Escol Sellers, of Sellers' Landing, Ill. :

I claim first, the above-described mode of reducing paper pulp to a condition for transportation, by a system of alternate exhaustion and compression, substantially as described and for the purpose specified.

Second, The use of the same mode for the combination of pulp or fiber and other matters of various qualities, for the purpose of producing boards or cards suitable for use in the arts.

41,103.—Grain Thrasher.—D. H. Shearer, of Drakesville, Iowa :

I claim first, a shaker for a grain-separating machine, composed of a perforated board, a, having parallel toothed strips, d, attached longitudinally to it, in combination with the stationary toothed strips, e, arranged substantially as and for the purpose set forth.

Second, The shaker spout, S, provided with a screen, l, and supplemental spout, T, arranged to discharge the grain and tailings into the machine, as shown for the purpose specified.

[This invention relates to a new and improved grain-separating machine, for separating grain from straw, and the former is thrashed from the latter. The invention consists in a novel and improved grain-shaking device and chute, and also in an improved arrangement of means for conducting the grain to the shoe, and in an improved arrangement of the shaker and chute, together with an elevator and screen for separating the tailings from the thrashed grain, so that the latter will not be twice subjected to the thrashing operation.]

41,104.—Washing Machine.—William W. Spalding, of Galesburg, Ill.—Antedated Dec. 5, 1863 :

I claim the oscillating braces, E, guide grooves, G, and guide rollers, F, in combination with rollers, B, and sub-board, C.

41,105.—Drag-Sawing Machine.—Isaac Starr, of Prairieville, Mich. :

I claim the arrangement of the feeding gear, viz., the lever, d, for shifting the pinion which operates the roller, in combination with the dog-carrying lever, B, and the trigger connected therewith, all constructed and operating substantially as described.

41,106.—Sugar Evaporator.—Francis L. Stewart, of Murrysville, Pa. :

I claim first, separating the side lays or that portion on either side of the pan, A, not over the fire from that portion directly over it, by ledges, c c, which extend from the partition, b, to a point immediately over the front wall of the furnace, leaving a space between them and the front end of the pan, A, for the scum which is by ebullition thrown towards either side of the pan to pass behind the ledges, whereby it is prevented being boiled into the syrup, as described.

The shallow filtering drawer, E, arranged within and extending across the front end of the pan, C, and under the rear end of the pan, B, in combination with the sliding gate or register, e, constructed and operating in the manner described.

[This invention consists in the arrangement of two abutments, extending from the inner toward the outer end of the first compartment or division of a range of sugar pans, just over the side walls of the furnace and terminating in points over the end wall, leaving spaces at the end and on each side of the pan, in such a manner that the scum rising in the middle or hottest portion accumulates behind these abutments and becomes separated from the clear juice, and that said scum can easily and conveniently be removed from the pan; the invention consists further in the arrangement of a filtering drawer, placed under a series of openings which lead from the second to the third compartment or division, and which can be closed or adjusted by a sliding gate, in such a manner that the juice or syrup can be run through a stratum of bone black or other suitable material, and that the wild or green taste of the syrup can be removed, before the syrup is finally boiled down in the finishing pan; the invention consists finally in the arrangement of a crystallizing pan suspended on two gudgeons and provided with a long beak, in such a manner that it can easily be lifted, and that the successive batches of syrup, directly upon arriving at the proper density to secure perfect crystallization, can be dumped into a cooler below.]

41,107.—Churn Power.—J. B. Sweetland, of Pontiac, Mich. :

I claim the arrangement of the variable drum, E, gearing, C e H, crank, K, adjusting balance, L, and rods, M N, with the dasher rod, P, in the manner herein shown and described, and for the purpose specified.

[This invention consists in the employment or use of gearing or a train of wheels in connection with a screw, arranged with a weight to act as a driving power, the screw having a balance crank at one end through the medium of which and a connecting rod an up and down movement is communicated to the dasher rod.]

41,108.—Suspended Bunker Lamp.—Henry J. Van Thiel, of Stapleton, N. Y. :

I claim a suspended or bunker lamp, having its fountain, A, provided with a screw plug, C, in its bottom, and a horizontal wick tube, D, attached to its lower end as herein set forth.

[This invention relates to a new and improved lamp of that class which are suspended in the holds of vessels and are designed for the use of stokers, engineers, &c., and commonly termed "bunker lamps." The object of the invention is to obtain a lamp of the clas specified, which will admit of an uniform supply of oil to the flame so long as any of the former remains in the fountain of the lamp, and at the same time prevent all leakage and overflow of oil, hitherto occasioned by the swinging of the lamp under the motion of the vessel.]

41,109.—Marine Propeller.—Reuben C. Vernol & Jos. T Martin, of New York, N. Y. :

I claim first, the racks, i i, and pinions, j j, in combination with the two sets of reversed floats, b b, and b b', substantially as and for the purpose herein specified.

Second, The bars, f f and e e, in combination with the frames, B C, the floats and the frames, D D', substantially as and for the purpose herein specified.

[This invention consists in a novel arrangement of folding buckets in a reciprocating propeller, and in certain novel means of providing for the reversal of the direction of the propulsion without reversing the engine. J. T. Martin, of No. 68 South street, New York city, may be addressed in relation to this invention.]

41,110.—Screw-Plate. — C. C. Walworth, of Boston, Mass. :

I claim a screw-plate, constructed substantially as described.

Also the arrangement of the handle or thumb-nut of the screw which clamps the die cover, as specified for the reasons set forth.

41,111.—Medical Compound.—John Weaver, of Knightstown, Ind. :

I claim a compound of the ingredients and in the proportions substantially as specified, as a specific for the cure of chronic camp diarrhea.

[This medicine has been found a very efficacious remedy for the complaint named.]

41,112.—Submarine Explosive Projectile.—James D. Willoughby, of Washington, D. C.:

I claim first, the combination of buoys or floats, A A' A, with a torpedo or magazine of powder suspended beneath the same, and operating substantially as and for the purpose herein described.

Second, In combination with a floating torpedo, a rocket constructed and applied substantially as described.

Third, The means substantially as described, applied to the buoy and torpedo for exploding the latter automatically.

Fourth, The adjustable extension rods, E E, or their equivalents, for supporting the torpedo and rocket and allowing the same to be raised or depressed, substantially as described.

Fifth, The combination of a traveling torpedo with a paying-out apparatus, constructed for guiding the torpedo in its course through the water without the interposition of a rudder, substantially as described.

Sixth, The combination of a "dark lantern," L, with a traveling torpedo, substantially as and for the purpose described.

Seventh, Arranging and supporting the torpedo beneath the buoy, substantially as described, in such a relation therewith that the torpedo can be brought under the keel of a vessel and there exploded, substantially as described.

Eighth, A rocket torpedo, consisting of the magazine, B, fuse or fuses, c c, and rocket, D, constructed substantially as described.

41,113.—Cheese Press.—L. C. Winslow, of Canton, N. Y. :

I claim the ratchet cam-wheels, B B, and lever frame, C, provided with the double pawls, D, in combination with the cheese-board, H, and the pressure bars, E E', connected with the wheels, B, as shown, all arranged to operate with or without the extension lever, J, substantially as and for the purpose herein set forth.

[This invention consists in the employment or use of a lever-frame provided with pawls and arranged in connection with ratchet cam wheels, pressure bars and an adjustable cheese-bed, whereby a very small and efficient cheese-press is obtained.]

41,114.—Shoe for Car Brakes,—Joseph Wood, of Red Bank, N. J. :

I claim the shoe, A, and sole, B, when one is dovetailed to the other, and when they are so held together by a retaining pin or bolt, m, or its equivalent, that on withdrawing the same the sole can be readily detached from the shoe as specified.

41,115.—Disabling Ordnance.—Edward E. Bean, of Boston, Mass., assignor to himself, L. H. Straw, J. A. Locke and E. Leland :

I claim a plug for temporarily disabling a cannon, which can be inserted in its bore and locked in place, and can be again removed without injury to the gun by a suitable key, substantially as described.

Second, I claim the segments, F, operated by the central cam, D, in the manner and for the purpose substantially as described.

Third, I claim operating the cam, D, by a combination key and lock, in the manner substantially as described for the purpose set forth.

Fourth, I claim the projection, q, on the key, g, and lip, 8, on the head, b, by which the key may be employed for introducing or removing the plug, substantially as set forth.

41,116.—Jig Saw.—Louis M. Berry & Nathaniel S. Graves, of Boston, Mass., assignors to said Louis M. Berry & James A. Woodbury, of Winchester, Mass. Antedated Dec. 16, 1863 :

We claim the combination of mechanism for supporting and operating the saw, the same consisting not only of the separate vertical sliders, L L', the two parallel shafts, B C, and the cranked wheels, I I, and slotted plates, K K, for mechanism for connecting each of the shafts and its slider) but of mechanism, viz., the pulleys, D D, and endless belt, E, for connecting the two shafts in such manner that one may drive the other, and both be driven at the same rate of speed, the whole being substantially as described.

And in connection with the said combination we claim mechanism for straining the saw, the same consisting of the auxiliary slider, O, the screw, d, and nut, e, the whole being applied as and so as to operate together, as specified.

We also claim the combination of the endless band, E, and the two

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pulleys, D D, with the connecting rod, g, and its crank pins, F F, projecting from the said pulleys.

41,117.—Revolving Fire-Arms.—H. A. Briggs & Lamb S. Hopkins, of Norwich, Conn., assignors to themselves and C. A. Converse, of the same place:

We claim first, the laterally-swinging frame having a bearing on the long pin, f, which extends from the front to the back of the main frame, A, and supporting the cylinder axis pin both in front and in rear of the cylinder, and otherwise applied in combination with the main frame, A, substantially as and for the purpose herein specified.

Second, The plunger, F, applied in combination with the laterally-swinging link and with a cylinder which is arranged to swing laterally out of the main frame, substantially as and for the purpose herein specified.

41,118.—Postage and other Stamps.—Abram J. Gibson, of Worcester, Mass., assignor to Edward Livermore, of New York city, and Jonathan Luther, of Worcester, Mass.:

I claim the printing of postage and revenue stamps or other stamps of similar character requiring cancellation, with an impression or impressions made wholly or partly in fugitive ink which will be destroyed or removed by the destruction or removal of the ink employed for their cancellation, substantially as herein described.

41,119.—Composition for Paint.—A. B. W. Bullard, of Worcester, Mass., assignor to Augustus Richardson, of Framingham, Mass.:

I claim the above-described composition as made of the materials and in manner substantially as specified.

41,120.—Corn Planter.—J. P. Hines, of Independence, Iowa, assignor to himself, G. H. Robinson and John Dunster, of same place:

[This invention consists in an improvement in the means employed for istributing the seed, and also in an improvement in the arrangement of the frame or mode of mounting the same, whereby an exceedingly simple and efficient device is obtained for the planting of corn, and one which will be fully under the control of the operator.]

I claim the arrangement and combination of the wheels, C E E, hoppers, F, and sheathed standards, C, with the spindle, G, lever, H, and seat, K, in the manner herein shown and described.

41,121.—Last-finishing Machine.—Joel McComber, (assignor to James McComber), Herkimer, N. Y. Antedated Dec. 26, 1863:

I claim, first, The employment or use of the adjustable carriage, F, in connection with the plates, G K, applied to the carriage, F, substantially as shown and arranged so as to admit of a separate longitudinal adjustment of the plate, K, while both plates, G K, are allowed to turn on the carriage from a pendent rod, H, as a center, for the purpose herein set forth.

Second, The adjustable plate, provided with an upright ledge or flange, o, having a concave recess, p, made in its upper surface, in combination with the longitudinal rib, s, attached to the inner side of the plate, G, substantially as and for the purpose herein set forth.

Third, The combination of the carriage, F, plates, G K, and cutter-head, C, provided with the toe and heel cutters, a b, all arranged and combined for joint operation as and for the purpose herein set forth.

[This invention relates to a machine for forming the toe and heel of lasts which are turned by machinery, said parts not being finished by the last-turning machines. The object of the invention is to obtain a machine for the purpose specified which will perform the work in a perfect manner, be capable of being adjusted to operate upon lasts of different sizes, and also form the curve at the ends of the last as may be desired.]

41,122.—Calendar Clock.—D. J. Mozart, New York City, Levi Beach, Farmington, Conn. and Laporte Hubbell, Bristol, Conn.:

We claim, rst, The application of a main spring, E, to operate the year wheel of the calendar movements independently of the main spring of the clock, substantially as described.

Second, We claim the arm, e3, in combination with the tripping wheel, b2, when said arm extends through the face of the calendar, substantially as and for the purpose described.

Third, The vibrating arm, e3, cylinder, f, or its equivalent, and ratchet 'scape wheel, f', for registering the revolutions of the wheel, b2, substantially as described.

Fourth, As an element of a calendar clock we claim the year wheel, D, constructed, applied and operating substantially as and for the purposes described.

Fifth, The manner specified of combining the year wheel, D, and seven-leaf pinion, g', for the purpose set forth.

Sixth, The supplemental or leap-year tooth, combined with year wheel, D, and operated by an eccentric, r2, cam wheel, J, and arm, L, substantially as described.

Seventh, The toothed month dial, G, applied to the arbor, i, of the year wheel, D, and operated by said wheel through the medium of a spring, k, substantially as described.

Eighth, And in combination therewith we claim the cylinder escapement, n, operating substantially as described.

Ninth, The month pinion, H, in combination with the year wheel, D, constructed substantially as described.

Tenth, The specified manner of applying the month and day pinions, g' and H, to the year wheel, D, for the purpose set forth.

Eleventh, The arrangement of the three dial plates, K G N, for registering months, days of the month and days of the week, substantially as described.

41,123.—Raking Device for Harvesters.—John Nelson (assignor to himself and Wales Needham), Rockford, Ill.:

I claim the endless chain, E, having the rake attached to it by means of the link, H, and the rake fitted on guide rods, b b, as shown, in combination with the slotted platform, A, all arranged as and for the purpose specified.

I further claim the lever, g, provided at one end with the fork, m, and at the opposite end with the V-shaped projection, u, in combination with the shaft, g, having teeth, l, attached, and the pendent plates, r r', rod, s, and plates, t, at the under side of the platform, all arranged as and for the purpose specified.

[This invention consists in a novel and improved arrangement of an endless chain, rake and rake-adjusting mechanism, in connection with a slotted platform, whereby the rake, by a very simple means, is ma e to traverse or work back and forth underneath the platform, and have its teeth during its working movement project up through the slots in the platform so as to rake the grain therefrom, and during its return in an opposite direction leave its teeth below the plat form, so as to offer no obstruction to the cut grain as it falls upon the platform.

41,124.—Washing Fluid.—Helen Rose (assignor to herself and Giles Sanford), Milford, Mass.:

I claim the said hydro-alcoholic alkaline solution, as made in manner and for use substantially as hereinbefore specified.

41,125.—Eyeleting Machine.—J. F. Sargent (assignor to Elmer Townsend), Boston, Mass.:

I claim the combination in one instrument of the set and feeding device, made to operate on the eyelet, substantially as above set forth.

I also claim imparting the vertical movements to the movable set by means of the rod, g, and levers, n o, arranged and operating together substantially as specified.

I also claim the manner of adjusting the upper set, b, with relation to the lower set and the stock to be eyeleted as above set forth.

I also claim the manner of applying the stop spring, so that the flange of the eyelet is drawn against and over the same, for the purpose specified.

I also claim the combination of a stationary hopper, with a rotating disk or plate and a chute as above set forth.

I also claim combining with the stationary hopper an adjustable or gaged gate, substantially in the manner as above specified.

And in combination with the vibrating set, d, I also claim the use of the spring pin or sliding pin, r, to feed the eyelet from the stationary chute, substantially as described.

41,126.—Method of Removing Submerged Torpedoes.—Charles Sholl, Brooklyn, N. Y., assignor to F. A. De Mey, New York City:

I claim the removal of torpedoes or other submerged or partly submerged obstacles or obstructions from harbors, rivers or other waters, by throwing over them, from a mortar or mortars on board of a vessel placed at a suitable distance, projectiles which are connected with the vessel by one or more ropes or chains of suitable length, and then propelling the vessel in a direction to tighten the latter rope or ropes or chain or chains, and drag away the said obstacles or obstructions, substantially as herein specified.

And I also claim the combination of the vessel, A, one or more mortars, B B, and projectiles, C C, the rope or ropes, D D and a, or their equivalents, the whole arranged to operate substantially as and for the purpose herein specified.

41,127.—Projectile for Rifled Ordnance.—W. H. Smith (assignor to himself, R. M. Bassett and C. D. Gibson), Birmingham, Conn.:

I claim my improved casing for sub-caliber projectiles, consisting of a light metallic jacket, B, combined with a movable supporting disk, C, and an exterior envelope, E, of paper, papier-mache, leather, rubber, gutta percha, cotton, lithoconia, hemp, or other similar and equivalent, soft, plastic, fibrous or elastic materials, either singly or in their combinations, the whole being united and arranged substantially in the manner and for the purpose herein set forth.

I claim also, the combination of my improved casing as described, with any suitable form of sub-caliber projectile for ordnance, substantially as is herein set forth.

41,128.—Valve Gear of Steam Engines.—W. G. Snook, Corning, N. Y., assignor to himself and O. C. Patchell, Blossburgh, Pa.:

I claim the combination of the eccentric, C, having its periphery composed of four arcs and the strap, D, having four bearing points, the whole operating substantially as and for the purpose herein set forth.

41,129.—Reclining Chair.—W. H. Van Nortwick (assignor to himself and R. S. Van Rensselaer, Bordentown, N. J.:

I claim the sliding frame, P, and folding frames, Q R and S, or their equivalents, in combination with the seat, D, and the framework or other support to which the seat is hinged.

41,130.—Riding Saddle.—Paul Weber and Louis Muller, Stuttgart, Kingdom of Wurtemburg, assignor to G. L. Weber, New York City:

We claim, first the seat, C, being supported by the strip, B, and bows, b c, in combination with the pads, D D, constructed and operating in the manner and for the purpose substantially as shown and described.

Second, The girth, E, made of a series of cords, g, fastened together by two or more cross bands, h, as and for the purpose specified.

[The object of this invention is to produce a saddle by which the horse is not pressed when in motion, one which will readily accommodate itself to the changes in the shape of the horses back consequent upon the greater or smaller amount of labor or exertion to which the horse may be subjected at different times, and the seat of which will at all times be kept cool and comfortable by a current of air passing through between it and the back of the horse. The invention also relates to an improvement in the girth, whereby the same is made easy for the horse and cheap and durable in its construction.]

41,131.—Safety Hook.—C. S. Abeel, Chicago, Ill.:

I claim, first, the combination of the hook, A, the adjustable bar, B, and the peculiarly-arranged spring, C, all arranged and operating substantially as and for the purposes herein specified and shown.

Second, In combination with the above, I claim the employment of one or two guards, a, for the purposes specified.

Third, I claim, in combination with a snap hook arranged as shown, the interior projection, E, for the purposes herein shown and set forth.

41,132.—Mode of Ornamenting Metals.—N. A. Batchelor, New York City:

I claim the cementing of plate or sheet metal ornaments to the article to be japanned, and then applying the japan as described.

41,133.—Pump.—Cornelius Bollinger, Harrisburgh, Pa.:

I claim, first, The legs, R R, on the cylinder head with the lugs on the piston head, when applied to prevent its turning when the piston rod is screwed in to tighten the packing.

Second, I claim a piston rod with a screw working in the piston head and provided with a cone, by which the segments to tighten the packing may be pressed out, substantially as described.

Third, In combination with the cone on the piston rod I claim the recesses in the piston head and follower, which receive the cone, and also the recess in the cylinder head, Q, which receives the end of the piston.

Fourth, In combination with the devices for tightening the packing, I claim the spring pall, P2, making into countersinks in the piston rod for the purpose set forth.

Fifth, I claim the packing box on the cylinder head in combination with the cone on the follower or plate, M'.

In combination with the cylinder, A, I claim the valve box and valves constructed and arranged substantially as described.

41,134.—Adjustable Clothes-Rack.—Jehu Brainerd and W. H. Burridge, Cleveland, Ohio. Ante-dated Dec. 30, 1863:

I claim the bracket, D, arms, A B C (one or more being used), the reversible hook, H I J, the several parts being constructed, arranged and combined as and for the purpose herein set forth.

41,135.—Toilet and Writing Case Combined.—L. B. Brooks, Salem, Mass.:

I claim the combination of the work and toilet case with roll-up writing case, substantially as described.

41,136.—Ink-well.—Franklin C. Brownell, Brooklyn, N. Y. Ante-dated Dec. 30, 1863:

I claim the use of a contracting groove, G, or its equivalent around the exterior of an ink-well or its top or cap, in combination with one or more lugs, D D, fastened to or forming part of the socket for the ink-well, the same being constructed and operating substantially as and for the purpose specified.

41,137.—Die for Nut Machines.—O. C. Burdict, New Haven, Conn.:

I claim a die composed of four pieces, when the same are of the form and combined and arranged in the manner and for the purpose substantially as herein set forth.

41,138.—Spading Machine.—J. L. Cole, Chariton, Iowa:

I claim the spade or fork standards, M, constructed with a crook or oblique portion, c, and operated through the medium of the levers, L, pitman, K, and crank pulleys, J, or their equivalents, in combination with the rollers, N N', all arranged and applied to a mounted frame, A, to operate as and for the purpose herein set forth.

41,139.—Rolling Cask or Barrel.—E. L. Collins.—Wellfleet, Mass.:

I claim the disks, B B, or their equivalents, the draft yoke, C, and the spring, D, combined and arranged with respect to one another substantially in manner and so as to operate as specified.

41,140.—Ladies' Collar.—C. O. Crosby, New Haven, Conn.:

I claim as a new article of manufacture the within- escribed ladies' collar.

41,141.—Machine for making Horse-shoe Nails.—Daniel Dodge, Keeseville, N. Y.:

I claim, first, The employment in a machine for making forged nails, of cutters so constructed, arranged and operating as to serve the purpose of cutting metal from the side to reduce the thickness and produce the desired form of the point of a nail, substantially as herein specified.

Second, The finger, f, or its equivalent operating in combination with the upper cutter, b, and with a fixed guide or gage, substantially as and for the purpose herein set forth.

41,142.—Washing Machine.—Samuel Davis, Providence, R. I.:

I claim the combination and arrangement of the dasher, B, and upright, C, with the deflector, D, Lever, E, Standard, I, rest, e, and shelf, f, substantially as described.

41,143.—Lehigh Forge Fires.—John Evans, New Haven, Conn.:

I claim the combination of a hollow water chamber front, D, with a water top, E, in the manner and for the purpose substantially as herein set forth.

41,144.—Hydrant.—J. P. Gallagher, St Louis, Mo.:

I claim the arrangement of the pipes, n k, in combination with the chamber, B, valve, A', and opening, p, all being constructed and arranged to operate substantially as and for the purposes specified.

41,145.—Elastic Fur Band.—J. W. Gay, Brooklyn, N. Y.:

I claim an elastic fur band composed of a strip of woven shirred goods attached to the strip of fur, as and for the purposes specified.

41, 146.—Muff.—J. W. Gay, Brooklyn, N. Y.:

I claim a muff formed with strips of fur around the ends, at the edges of the skins, for the purposes and as specified.

41,147.—Apple-coring and Slicing Machine.—C. H. Gifford, Auburn, Mass.:

I claim the reciprocating knife in connection with the intermittingly rotating fork, arranged to operate in the manner substantially as and for the purpose herein set forth.

I further claim the wheels, B C, and pawl, H, when used in combination with the knife, G, reciprocating bar, E, and fork attached to the shaft, D, for the purpose herein specified.

[This invention relates to a new and improved implement or device for coring and slicing apples, and it consists in the employment or use of a rotary fork on which the apple to be operated upon is placed, in connection with a reciprocating knife and feeding pawl for rotating the fork.]

41,148.—Hoop Skirt.—T. S. Gilbert, Derby, Conn.:

I claim overlapping the opposite ends of the hoops and securing them to vertical tapes or their equivalents, so arranged with the hoops as that the tendency of the hoops to assume a straight condition will lock the hoop ends and their vertical tapes together sufficiently to retain them effectually in any position to which they may be adjusted, substantially as set forth.

41,149.—Hoop Skirt.—T. S. Gilbert, Derby, Conn.:

I claim overlapping the ends of each spring, e, and securing its ends in or to a tape or tapes which also retains that position of the springs adjacent to each end of the latter.

41,150.—Steering Vessel.—F. N. Gisborne, London, England:

I claim, first, The eccentric movement of the armature herein described, whereby I am enabled to uncover a large signal with a very trifling movement of the armature, and with a minimum magnetic power consequent upon the armature being always in close proximity to the electro-magnet.

Second, The application of a double break in each circuit, the one being completed by the slide or shutter when up, the other by the pressure of the helmsman upon his reply lever, and thus by a single movement enabling him to repeat back many signals,

Third, The application of a contact maker to the rudder head or shaft of a vessel for the purpose herein described, and especially I claim the revolving side-wheel rubbing contact maker herein particularly described.

41,151,—Lubricating Composition.—G. W. Goodhue, Cincinnati, Ohio:

I claim a lubricant composed by taking residuum from the decomposing vat when only partially divested of oil, and combining pine tar therewith in manner and in proportions substantially as specified.

41,152.—Stove.—John Hafer, Bedford, Pa.:

I claim, first, the flange, d, resting on and projecting beyond the walls of the fire-pot, for the purposes set forth.

Second, The combination of a series of two or more flanges with the series of two or more cones of a stove, furnace or radiator, arranged, and operating substantially in the manner described.

41,153.—Dyeing Cotton, &c.—Henry Haigh and Richard Heaton, Huddersfield, England:

We claim the use of a solution of lime or other alkaline solutions instead of bichrome or bichromate of potash in the process of dyeing cotton or other vegetable fibrous substances catechu brown.

41,154.—Pump.—Elias Hale, Terre Haute, Ind.:

I claim the adjustable lever, D, provided with the opening, h, and adjusting gage bolt, k, the connecting rods, E E', vibrating bars, G G', and standard, C, the whole arranged and operating relatively to the piston rods, H H', and cylinders, B B', substantially as herein set forth.

41,155.—Horse Hay Fork.—J. D. Halstead, Rye, N. Y.:

I claim the employment or use in a horse hay fork, provided with a brace or toggle-joint bar, D, of a lever, F, arranged in relation with the toggle-joint bar to operate in the manner substantially as and for the purpose herein set forth.

41,156.—Bolting Shingle Blocks.—J. B. Hendy, Olean, N. Y.:

I claim a machine constructed with a bed plate, A, rollers, C, standard, D, and pivoted arm, E, substantially as described, for centering logs or cuts to be sawn into bolts for shingle machines.

[By means of this invention logs or cuts are expeditiously sawn into suitable blocks for the shingle machine, all the difficulties arising from cross or winding grain being overcome, and knotty, decayed and other unsuitable parts of the timber removed with the least possible waste.]

41,157.—Insulator for Telegraph Wires.—James Holland, Conshohocken, Pa.:

I claim an insulator and holder made of terra cotta, earthenware, or equivalent substance or substances adapted to a pole and formed for the reception of the wires, substantially as set forth.

41,158.—Steam Siphon for Raising Water.—H. S. Lansdell, St. Louis, Mo. Ante-dated Nov. 2, 1863:

I claim, first, The arrangement of the globe or socket, A, injection pipe, B, and delivery pipe, D, when the pipe, B, terminates within the globe or socket, A, above or opposite any part of the induction, C, substantially as and for the purposes set forth.

Second, I also claim the combination of the above arrangement with the reversed cones, a b, in the manner herein shown and described.

[This invention consists in contracting the entrance to the delivery or discharge pipe in conical form at a short distance from the mouth of the steam pipe which terminates opposite or nearly so to the center of the suction pipe, whereby I am enabled to raise the water in increased quantity and to force it to a greater distance or elevation.]

41,159.—Cultivator.—George Large, Rosemond, Ill.:

I claim the foot levers, F, in combination with the tie, G, the bars, H, the bars, P, the crosspieces, I and L, and the metal plates, m, the whole constructed and arranged in the manner and for the purpose set forth.

41,160.—Carpet Tack Protector.—R. K. Lee, Brooklyn, N. Y.:

I claim the tack protector formed by an eyelet introduced in a piece of leather or other suitable material, as set forth.

41,161.—Portable Crane.—S. R. Marshall, Wilkesbarre, Pa.:

I claim attaching the swinging frame, A, of a portable crane to the stationary upright and step which are used to support it, so that the said swinging frame may be lowered and raised substantially as described, for the purpose specified.

41,162.—Gun Sight.—F. N. Martin, Covington, Ky.:

I claim the open cylinders, b, or its equivalent made of suitable transparent material for the purpose above specified.

41,163.—Foot and Kneeling Stool.—R. H. Mathews, Alliance, Ohio:

I claim the herein-described construction of a combined foot and kneeling stool, the same being constructed, combined and arranged, substantially as and for the purpose herein set forth.

41,164.—Sewing Machine.—James S. McCurdy, Bridgeport, Conn.:

I claim the combination of an oblique slotted feed bar, fulcrum, and eccentric, or their equivalents, operating substantially as herein set forth.

I also claim the combination of said oblique, slotted feed bar, fulcrum, and eccentric, or their equivalents, with devices for adjusting the position of the fulcrum, the combination as a whole operating substantially as set forth.

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41,165.—Picker for Looms.—George B. Medberg, Sprague, Conn.:

I claim my improved application of the parts, of the screw and the picker relatively to one another and the staff, the same being substantially as specified.

41,166.—Fire-arm.—Joseph Merwin & Edward P. Bray, New York City:

We claim the arrangement of the vent, g, and nipple, d, in the breech-piece, B, in combination with the hammer, D, the recess, e, nose, c, chamber, C, and shell, E, as herein shown and described, so that without removal or alteration of the breech-piece, either fixed or loose ammunition may be employed, as set forth.

[This invention relates to fire-arms constructed to load at the breech with metallic cartridges which carry their own fulminating priming in a hollow flange surrounding the rear end, or what is termed fixed ammunition; and its object is to provide for the loading of such fire-arms, when the fixed ammunition gives out or cannot be obtained, with loose powder and ball and the firing by means of an ordinary percussion cap and to this end it consists in furnishing the movable breech of such a fire-arm with a nipple, and so constructing the hammer that its noose will strike the flange of the cartridge shell when the fixed ammunition is used, without any portion of it touching the nipple, but that when the fixed ammunition is not used and a cap is on the nipple a portion of the hammer may strike and explode the cap.]

41,167.—War Vessels, the parts applying to other Structures for Defense.—Mary Jane Montgomery, New York City:

I claim, first, In armor for war vessels and other defensive structures the corrugated beams, A A′ A″, and the intermediate flat plate or plates, B, in combination with the steel plates, C, or steel-faced plates, C and C′, substantially as set forth.

Second, The introduction of wooden beams or tongues into the corrugations of corrugated iron beams in the manner set forth, and attaching thereto the planking, I I I, or other sheathing material, substantially as described.

41,168.—Fruit Box.—A. F. Newell, Warren, Ohio:

I claim grape and fruit boxes as a new article of manufacture, composed of thin sheets of wood, so cut, as herein described, that they may be folded into a compact form for transportation, before being filled, completed and secured as herein set forth.

41,169.—Cheese Press.—Miron Owen, Potsdam, N. Y.:

I claim the combination and arrangement of the eccentric, B, roller, D, provided with the ratchet wheel, L, and lever, K, provided with the pawl, Z, in the manner and for the purposes herein set forth.

41,170.—Instrument for Inserting Rivets in Textile Fabrics.—Willoughby H. Reed, Philadelphia, Pa.:

I claim the use substantially in the manner described of the sharp pointed pin, H, with a hole or recess in the base for the purpose of inserting the stems of rivets into fabrics as set forth.

41,171.—Windlass.—Edwin Reynolds, Mansfield, Conn.:

I claim the application of a sheave or sheaves mounted upon a traverse bar or guide to a windlass rope, so that an impingement of the successive coils of the rope is prevented, in the manner and for the purpose substantially as descibed.

I also claim the combination and arrangement of the drum, a, screw shaft, d, nut, i, traverse bar, k, and sheaves, m, substantially as specified.

I also claim regulating the total extent of traverse of the nut, i, or the screw shaft, in the manner substantially as set forth.

41,172.—Lamp Burner.—M. B. Wright, West Meriden, Conn.:

I claim the combination of a base, A, of any suitable form, the flat wick tube, B, and the converging jacket, C, terminating in a level or nearly level top, forming an elongated aperture at a distance above the top of the wick tube, B, when the said parts are constructed and arranged in the manner herein shown and described, so that when in use the upper part of the wick will be exposed above the top of the wick tube and the base of the flame will rest on the top of the jacket, C.

[This invention consists in providing the burner with a jacket formed and arranged relatively with the wick tube, in such a manner that the flame is isolated from the wick-tube and made to rest upon the top of the jacket, between which and the wick a current of air rushes upward and impinges against the base of the flame, supplying the latter with a requisite amount of oxygen to support proper combustion and at the same time keeping the burner cool, so as to prevent an undue volatilization of the oil in the lamp. The invention is designed for a coal-oil burner to be used without a draught chimney.]

41,173.—Signalizing Shell for Ordnance.—Gaetano Amici, Copenhagen, Denmark, assignor to Thorwald F. Hammer, Boston, Mass.:

I claim, first, The combination of a parachute and its attached illuminating pot with a shell of suitable form and material, to be fired from a gun or mortar.

Second, The shield and spreader, i, for the purpose preventing the lines, k k, from becoming entangled with the chain, h, and pot, f, and for facilitating the spreading of the parachute, the whole constructed substantially as herein set forth and for the purpose described.

41,174.—Pump.—Cornelius Bollinger, Harrisburgh, Pa., assignor to himself and Joel K. Bollinger, Manchester, Md.:

I claim, first, The scores, L L, on the piston or making it smaller next to the flanges than it is midway between them, to form seats for the packing ring when it comes to the flanges.

Second, In combination with the piston and packing above claimed, I claim the cylinder arranged to traverse alternately in an opposite direction to the piston.

41,175.—Constructing Flat Chains for Bracelets.—Joseph Christl, Newark, N. J.:

I claim in the construction of ornamental chains for bracelets and other articles of jewelry, the combination of the cross bars with the chain or chains to which they are attached, and which are made substantially as herein described.

41,176.—Corn Planter.—John H. Elward (assignor to himself and W. H. W. Cushman), Ottawa, Ill.:

I claim in combination with a seed-dropping device, the two hoes, D and L, when the wings of their blades are of unequal width, and when constructed and arranged in the manner and for the purposes herein described.

I also claim in combination with the hoes, D L, as herein described the clob-breaking rollers, M, when the latter can be shifted so as to act inside of the furrow, substantially in the manner and for the purposes herein described.

I also claim the double-slided seed-dropper, consisting substantially of the double seed-box, I, seed-slides, f g, and double acting lever, K.

41,177.—Lock.—Thomas G. Harold (assignor to himself and John W. Kissam), Brooklyn, N. Y.:

I claim, first, A turning block provided with an arm taking the notch or talon of a sliding bolt, as specified, in combination with the stationary block and divided stop pins, whereby the bolt will be projected by the arm and retained in that position by the stop pins set forth.

Second, I claim the knob or turner, 3, at the end of the turning block, e, in combination with the divided stop pins, whereby the lock can be locked without using the key as specified.

Third, I claim the tube, k, screwed into the lock case, and acting to adjust the bearing of the block, e, against the block, f, for the purposes and as specified.

Fourth, I claim inclines formed on the end of the stationary block, f, in combination with divided stop pins for the purposes and as specified.

Fifth, I claim divided stop pins formed with shanks projecting into the holes that receive the key bits, when such shanks are smaller than the pins themselves for the purposes specified.

41,178.—Lock.—Thomas G. Harold (assignor to himself and John W. Kissam), Brooklyn, N. Y.:

I claim, first, Constructing and arranging the turning block and stop pins, so that the bolt shall be withdrawn and the stop pins made to coincide when unlocked, for the purposes and as specified.

Second, I claim the pins or bits of the key formed as screws, adjustable with the key or holder, so that their length may be determined as specified.

41,179.—Lamp Burner.—Joseph Magoun, East Cambridge, Mass., assignor to the New England Glass Company:

I claim the improved burner as having its body, wick-tube cap or supporter, and wick-tube confined together by means of main and counter shoulders struck or punched up from the wick-tube, as specified.

I also claim my improved arrangement and application of the spring, C, relatively to the body, A, the cap, D, and the catch, E, the whole being substantially as explained.

41,180.—Machine for Inserting Blind Staples.—David M. Smyth (assignor to himself and S. N. Lewis), New York City:

I claim, first, Separating the staples and suspending them by means of the bar, e, and slot in the incline, c, for the purposes and as specified.

Second, I claim the bar, f, in combination with the bar, e, for retaining the staples in place as supplied to the machine as set forth.

Third, I claim the spring, o, and punch, l, conveying the staples successively from the bar, e, and driving them as specified.

Fourth, I claim the sliding bed, k, and pins, l, for receiving the blind and holding the slats in position while the staples are being inserted, as specified.

41,181.—Furnace Grate.—S. Lloyd Wiegand & W. Barnet Le Van, Philadelphia, Pa, Ante-dated Dec. 21, 1863:

We claim, first, Combining bars cast with mortises through them with tenons cast separate and placed between them, in the manner or any equivalent manner as set forth.

Second, Separating the bars by means of flanges cast or otherwise, formed or fixed upon the tenons for the purpose of regulating the draft spaces, as shown and described.

Third, We claim the supporting bars of the grate when constructed and shaped substantially as above described.

Fourth, We claim the combination of the supporting bars constructed as described with the draft spaces near the end of the grate bars, when the supporting bars are located in relation to the series of tenons and mortises, substantially as above described.

Fifth, The combination of rims around the mortises with the tenons, when constructed and arranged substantially as set forth and described.

41,182.—Steam Engine Indicator.—S. Lloyd Wiegand & Wm. Barnet Le Van, Philadelphia, Pa. Ante-dated Dec. 21, 1863:

We claim, first, The use of flexible vessels inflating and contracting with variations of pressure therein in combination with a pencil point for the purpose of describing or recording lines upon a moving sheet of paper, whether such vessels operate by the elasticity of their own walls or by the elasticity of the walls thereof, in combination with the elasticity of a spring or springs or if such flexible vessels are not at all elastic, but are made to be so in effect by the combination of a spring or springs.

Second, The use of the combination of rollers, ratchet wheels and cords, as drawn and described, for the purpose of moving the paper when combined with the flexible vessel and pencil, as herein-before set forth.

Third, The use of the second pencil for describing the neutral or atmospheric line, arranged substantially in the manner set forth.

41,183.—Cartridge for Revolving Fire-arms.—David Williamson (assignor to the Moore's Patent Fire-arms Company), Brooklyn, N. Y.:

I claim a flattened or oblong teat or nipple, at the rear end of the metallic cartridge case, to be struck by the hammer while resting upon a flat or nearly flat surface, substantially as and for the purposes specified and in combination therewith,

I claim the hemispherical rear-end of the cartridge case for the purposes and as specified.

41,184.—Revolving Fire-arm.—David Williamson (assignor to the Moore's Patent Fire-arms Company), Brooklyn, N. Y.:

I claim a series of parallel chambers in the cylinder of a revolving fire-arm, in which the inner or rear ends of the chambers are contracted in a hemispherical or tapering form from the ordinary caliber of the chamber to the rear end of the cylinder, so that an abutment is obtained in the cylinder itself at the rear of each chamber, without requiring an increase in the length of such cylinder as specified.

RE-ISSUES.

1,596.—Lamp Chimney.—Warren L. Fish, Newark, N. J. Patented June 22, 1862. Re-issued Dec. 23, 1862:

I claim, first, Forming over and around the flame of an ordinary kerosene or other lamp, a heating chamber, having no other outlet than the flue or chimney of the lamp, and being in fact a chamber in the chimney of the lamp, by which it is adapted for heating or cooking purposes.

Second, I claim the use in connection with oil lamps of ordinary construction and operation of heating vessels containing a central flue so shaped as to form the chimney of said lamp, substantially as herein shown and described, whereby the same lamp may be used for both illuminating and heating purposes or for either.

Third, In oil lamps of ordinary construction and in connection with a heating vessel, I claim the use of a bulb or its equivalent device, for the intermediate support of said vessel by or over the lamp, substantially as herein shown and described.

Fourth, In combination with a heating vessel and bulb, I claim the use of a window or of windows or the equivalent thereof made of a transparent material for the transmission of light through it, substantially as and for the purposes set forth.

1,597.—Knob Latch.—Charles A. Miller, Philadelphia, Pa., assignee by mesne assignments of Albert M. Hill, Branford, Conn. Patented June 11, 1861:

I claim, first, A latch bolt so constructed and so connected to a door lock that it can be turned without in any degree withdrawing or detaching it from the lock case and without removing the detachable plate of the same.

Second, The plate, I, or its equivalent so arranged and applied to the lock in respect to the latch bolt and to one of the screws by which the lock is secured to the door, that on withdrawing the said screw, the latch bolt can be turned and on re-inserting the said screw the latch bolt will be prevented from turning, as herein set forth.

1,598.—Plow Coupling.—George Owen, Jacksonville, Ill. Patented Feb. 4, 1862:

I claim, first, Connecting two single plows by means of the hinged coupling pieces or rods, s s, attached to the beams of said plows in the rear of the standards thereof, so as to bring the plows close together and thereby form a double-mold-board plow, substantially in the manner and for the purpose described.

Second, I also claim the combination of the curved or bent piece or pieces, t t, and the sliding joints of the bars, C and D, in the manner and for the purpose herein specified.

Third, I also claim connecting the compound curved or bent, coupling-bar, C, with the upper coupling-bar, D, substantially in the manner and for the purpose herein set forth.

Fourth, I also claim the combination of the front curved or bent stretcher-bar, B′, and curved or bent coupling-bar, C, for connecting two plows, substantially in the manner and for the purpose herein set forth.

1,599.—Manure Spreader.—James H. Stevens, East Durham, N. Y. Patented March 25, 1862:

I claim, first, The arrangement of the endless flexible bed, C, windlass shaft, J, and its connections, in combination with the buckets, D, spring, f, and conducting tubes, G H I, the whole combined and operating in the manner and for the purpose described.

Second, The arrangement of the endless flexible bed, C, rollers, B B, sides, A, conducting tubes, G H I, and framing, F, the whole supported upon wheels and operating in the manner and for the purpose described.

Third, The arrangement of the endless flexible bed, C, in connection with windlass shaft, J, and wheel, N, operating in the manner and for the purpose described.

Fourth, The arrangement of the endless flexible bed, C, in connection with windlass shaft, J, and hand crank, constructed and operating substantially in the manner and for the purpose described.

1,600.—Sewing Machine.—Elmer Townsend (assignee of Wm. Butterfield & Edgar M. Stevens), Boston, Mass. Patented July, 5, 1854:

I claim separating into two instruments a presser foot and a "rest cast off," (both operating on the surface of the material to be sewed), the tube or holder hereinbefore referred to, so that the "rest cast-off" can act independently of the presser foot as respects its times and extent of motion, substantially in the manner specified.

Also constructing the "rest cast-off" of such a form that it operates and is located in front of the barb of the needle, instead of surrounding it, by which construction it operates in an improved manner, especially when sewing in narrow channels.

Also making the "rest cast-off" adjustable with reference to the needle, substantially as described.

Also the combination of a supporting surface crochet needle, and presser foot with a "rest cast-off," operating substantially as described.

Also the combination of a supporting surface crotchet needle, and feeding device with a "rest cast-off," operating substantially as described.

Also the improvement by which the "rest cast-off" is rendered capable of adapting itself to any ordinary thickness or variation of thickness of the fabric or article to be sewed, such improvement consisting in the above-described mode of operating it by the spring, F, applied to the carrier lever, E, and made to operate on the lower end of the recess, C, as stated.

Also the combination of the bobbin-holder, U, with the spring, V, the friction disk, R, and the axle on which the holder turns, the same enabling an empty bobbin to be removed from the holder, and a full one put in its place, without disturbing the connection of the spring with the bobbin and friction plate or disk.

1,601.—Lamp.—Joseph T. Van Kirk, Philadelphia, Pa., and Wm. M. Fulton, Elizabeth, N. J. Patented Nov. 29, 1859:

We claim, first, Forming the wick tube of lamps using a flat wick, of or from a solid continuous piece of metal, without lap, joint or seam, substantially as and for the purposes set forth.

Second, The combination of a wick-tube, so formed with the spindle, E, and wheels, D D, when formed from a single piece of metal, as described.

Third, Supporting the spindle, E, and wheels, D D, by a spring, substantially as and for the purposes set forth.

1,602.—Railroad Frog.—D. D. Lewis, Philadelphia, Pa. Patented May 17, 1859:

I claim, first, The ribs, A and A′, curved from the throat, x, outward in both directions, as set forth, for the purpose specified.

Second, The ribs, A and R, so beveled and rounded on the edge that they will conform to or nearly conform to the treads and flanges of the car wheels, for the purpose described.

Third, The steel point, h, dovetailed to the body of the frog, in combination with the tread plate, k, and the block, i, when the said trend plate overlaps, and is secured to the said point, and when the block, i, is of such a tapering or wedge-shaped form, that during the process of riveting it and the tread plate to the body of the frog, the said block may serve the purpose of driving the point tight into its socket.

DESIGNS.

1,879.—Clock Case.—George B. Owen, New York City:

1,880.—Spoon Handle.—George Sharp, Philadelphia, Pa.:

1,881.—Cook's Stove.—N. S. Vedder, Troy, N. Y., assignor to R. P. Myers, Cleveland, Ohio:

1,882.—Bas-relief of Gen. G. B. McClellan.—James F. Drummond, New York City:

NOTE.—In the above list of claims we recognize FIFTY-ONE patentees whose specifications and drawings were performed at the Scientific American Patent Agency. This is more than one-third of the entire number, and is what we consider a good week's work.—EDS.

PATENTS

GRANTED

FOR SEVENTEEN YEARS!

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MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter:

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT.

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D. BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands of inventors for whom they have taken out patents have addressed to them most flattering testimonials for the ser-

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never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

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The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5, accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F. and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

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On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for extension of Patent	$50
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On filing application for Design (three and a half years)	$10
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The Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

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Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

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Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort at extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention.

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Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They think they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

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Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO'S Agency, the requirements of different Government Patent Offices, &c., may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

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Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignments of patents. Fees moderate.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit to the Scientific American Office, and examine the Models and Drawings of the many interesting inventions which have been illustrated in its columns. Visitors are welcome to call at any time, and examine the files of the paper, and make themselves at home. Many of the inventors whose patents have been secured through this office, have called to express their thanks for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

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It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the Rights of Patentees, will be cheerfully answered.

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They request all interested in the distribution of this appropriation, or anxious to develop the subject for the public good, to send to this Department, on or before that day, samples of the hemp and flax in the different stages of preparation; of the fibers and fabrics prepared by them, accompanied by statements of the various processes used, and the cost of production in each case; also, descriptions of the kind and cost of machinery used, where made, &c., together with any and all information that may be useful to the Commission.

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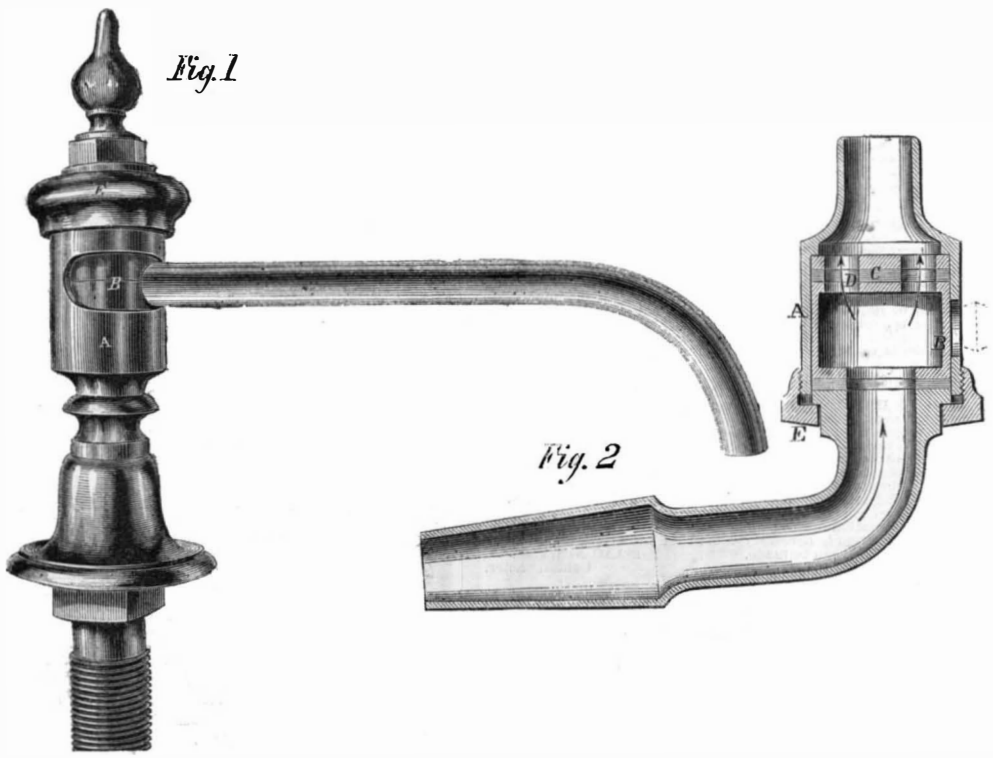
Improved Faucet.

One of the most annoying of the minor troubles of life is the incessant leakage of faucets attached to water-pipes. Water is so universally introduced into the cities and towns throughout the country that a durable and tight faucet is a public necessity. Very often much damage to ceilings and merchandise occurs through the imperfections of water faucets; the one illustrated herewith is an improved form of water faucet and embraces some novelties in the arrangement of its parts. It is also economically manufactured, as all of it can be made in a lathe. In Fig. 1, we have a perspective view which represents the external appearance of the faucet, and in Fig. 2 a section through the middle. The chamber, A, of the



BROUGHTON'S IMPROVED FAUCET.

cock is bored out inside, and has a shell or valve, B, fitting easily within it; this valve and the chamber are faced off truly at the bottom and set upon a leather washer, C. In the bottom of the chamber and valve are two holes, D, through which the water rushes, when they are turned in line with each other by the handle screwed into the valve as shown, which also serves as the spout; there is also a leather washer between the chamber and the elbow-pipe. This faucet will wear a long time without getting leaky, and by simply screwing up the nut, E, the valve is forced down upon its seat again. This is a very neat and durable article, and will give good satisfaction. It was patented through the Scientific American Patent Agency, on Sept. 8, 1863; for further information address the inventor John Broughton, Chicago, Ill., or J. W. Oakman, 192 Fulton street, New York.

Agassiz's Museum.

Professor Agassiz, who is at once a wise and a modest man, said in the *Atlantic Monthly*, not long ago, that all his investigations in science had served only to convince him how little he really knew. Yet this great man, who lacks self-assertion while he enriches the store of our knowledge, is daily doing useful work for American science. He not only delivers a regular course of lectures in the Lawrence Scientific School at Cambridge, but prepares magazine articles and writes masterly volumes on natural history, finds time to undertake long journeys for scientific observation and directs the affairs of the Museum of Comparative Zoology in Boston.

The last report of this museum, just published in Massachusetts, shows some curious facts. Professor Agassiz, in his account of its operations for the year 1862, says that its collection embraces 100,000 specimens, representing 6,000 species, all preserved in alcohol. In the collection of the British Museum, which is now superior to that of Paris, there are but 20,000 specimens. This numerous collection in Boston necessarily permits an extensive system of exchanges, so that the whole country receives benefit from the operations of an institution which owes its foundation to Professor Agassiz's private gift of his own collection. Of birds, there are now in the Boston Museum more than 3,000 specimens; of reptiles, there are 174 different species; of fishes, 374 species and 2,799 specimens—ichthyology being Agassiz's specialty. This is a remarkable exhibit of the wonderful growth of a collection which is only four years old, but which is already the finest existing picture-gallery of the animal kingdom.

Firing Cannon Under Water.

Last year it was reported that an engineer in Boston had perfected a contrivance by which a gun of any size could be fired under water. Some interesting experiments on this subject at Portsmouth, England, are thus described:—

"A stage was erected in the harbor within the tide-mark; on this an Armstrong 110-pounder was mounted, loaded, and aimed, at low water, at a target placed also within the rise of the tide. When both gun and target were covered by the water to a depth of six feet the gun was fired by means of a tube. The targets were placed at from twenty to twenty-five feet from the muzzle of the gun. One was composed of piles and oak planking of a thickness of twenty-one inches; another consisted of the hull of an old vessel, the *Griper*, laid on a mud-bank; a third was made up of three inches in thickness of iron boiler-plates, bolted together and backed with timber. On all these the effect of shot and shell from the submerged gun was very startling. The wooden target was pierced through and through, the iron target was broken into pieces and driven into the backing, the solid shot passed right through both sides of the vessel, making a huge hole through which the water poured in torrents. A shell, with percussion fuse, burst in entering, opening up a chasm of five feet by three in the planking, shattering the ribs and bursting up the deck beams above."

Our ordnance bureau ought to look to this matter. If it is practicable to load and fire cannon under water, then the defence of harbors will receive a new help; and iron-clads, no matter how heavily they are armored above water, will be as weak and defenceless against such a submerged battery as the merest shell of a wooden frigate.

Steamboating on the Lakes.

The Cleveland *Herald*, in speaking of the changes that are taking place in the construction of steam vessels for the navigation of the great Northern Lakes says:—

"The days of 'floating palaces' and side-wheel steamers on our lakes for passenger travel, have almost entirely passed away. There is, we believe, at this time but one regular and exclusive line of side-wheel steamers (the Michigan Central Railroad Line between Detroit and Cleveland) now on our lakes. The screw steamers, or propellers, have superseded all others, for passengers as well as freight, and it will not be many years before a 'side-wheeler' will be looked upon with as much curiosity as a 'stern-wheeler' is at the present time. The change from stern and side-wheels to the screw has been rapid and successful. It is now very seldom that we hear of the building of any other description of steamboat on the whole line of lakes. They have proved themselves to be more safe, substantial and economical as carriers of freight, and are now being built with all the accommodations and luxuries of the old-time 'floating palaces' for passengers. In fact our lakes are now covered with a fleet of 'propellers' that combine the convenience, beauty and swiftness of the old side-wheel steamers, with the safety, durability and great carrying capacity of the 'screws.'

An eight-day clock whose machinery is made from soup bones is among the novelties of the Cincinnati sanitary fair.

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